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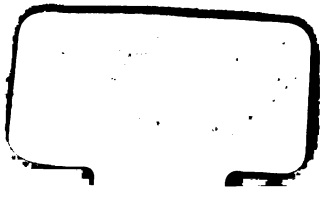

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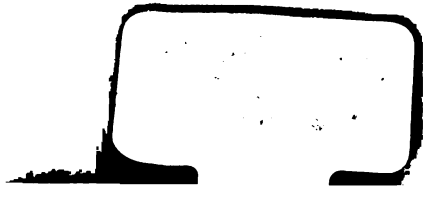

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RAILWAY EXPENDITURES:

THEIR

EXTENT, OBJECT AND ECONOMY.

TREATING OF THE

Elements of Cost of Constructing and Operating Railroads; The Relation They Sustain to Other Industries; The Principles that Govern the Organization of the Forces of Railway Companies; The Relative Cost of Construction and Operation; The true Theory of Taxation of Railway Property; The Elements that Determine the Cost of Transportation; The Principles that Operate in the Making of Rates; The Laws that should Govern Railway Accounting; The Expenditure Accounts of Railroads and the Theories and Practices that Determine their Proper Organization and Enforcement; The Division of Working Expenses and other Disbursements, and, finally, an Exposition of the best and most Economical Methods of Keeping the Account of Railway Expenditures.

BY

MARSHALL M. KIRKMAN.

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TO

MARVIN HUGHITT, ESQ.,

WHOSE LONG SERVICE AND GREAT TALENTS DISPLAYED IN THE ORGANIZATION AND CONDUCT OF RAILWAY AFFAIRS ENTITLE HIM TO BE REGARDED AS ONE OF THE REPRESENTATIVE RAILWAY MANAGERS OF THE UNITED STATES,

THESE VOLUMES ARE RESPECTFULLY INSCRIBED

BY

THE AUTHOR.

PREFACE.

Some years ago, I had occasion to write a short pamphlet on the disbursement accounts of railroads. This was followed by a small book on the same subject. Both of these productions met with a very flattering reception; this was owing, doubtless, to the fact that they were the first publications of their kind. I can see now that they were at best exceedingly crude and incomplete; indeed it was the conviction that this was so that prompted me to continue to give the subject such consideration as I was able. The result is the accompanying volumes which, while they are still far from being entirely satisfactory to me, come nearer, I think, a just conception of the subject in its entirety, than the productions referred to above.

CHICAGO, *June*, 1880.

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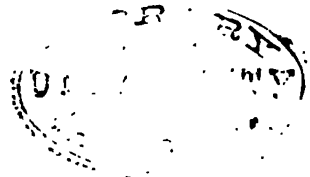

RAILWAY EXPENDITURES.

CHAPTER I.

INTRODUCTORY.

The Character of Railway Enterprise — Universality of a Railway Company's Expenditures — What those Expenditures are For — Who they Benefit — The Interests they Create and Foster — Classification of Expenditures, Permanent and Incidental — The Misapprehension that Exists as to the Character of Railway Enterprise — The Interests of the Railway Companies and of the Public Identical — The Money Earned by Railway Companies Expended in the Communities where Earned — Unproductiveness of Railway Capital — Importance to the Public that the Railways should be Sustained — The People Who own Railway Securities — The Consideration they Deserve, Etc., Etc.

The magnitude of details incident to the conduct of the affairs of a railroad company, while combining many of the features common to other classes of business, are, in the main, peculiar and exceptional in their character. So far, however, as concerns the construction and the keeping in order of its plant, its business is not noticeably different, save in magnitude, from that of manufacturers generally. It is a liberal consumer of the products of others, and a generous and continuous

patron of labor, including various classes of professional men not immediately connected with its service.

Of the semi-public character that attaches to railway companies as common carriers these volumes do not treat, except incidentally. What they have to say refers more immediately to the expenditures of railway companies, their philosophy, character, extent, relation to each other, and the rules and regulations governing them. They will, at the same time, aim to point out the great dissimilarity in the cost of constructing and operating different properties.

The expenditures of railroads compass, as we shall show, an infinite variety of objects having a common purpose in view, namely, the building up of the property and its subsequent operation.

They cover all the multitudinous expenses of a railway, commencing with the disbursements incident to its inauguration, and terminating with the distribution of its surplus revenue, years afterwards, among its bond and share-holders.

These expenditures, it will be found, embrace every thing required by a widely diversified business, from the purchasing of the vast domain required for tracks and station facilities, to the payment of wages of operatives; from the erection of mammoth warehouses to the planting of shade trees about the passenger depots; from the retaining of a lawyer of distinction and renown,

with all the expenses incident thereto, down to the employment of a lad whose sole business it is to supply water to the thirsty and sweat-begrimed operatives employed upon the construction trains of a railroad.

The disbursements of a company may be said to benefit, and therefore to interest, all classes. They extend through all the ramifications of commerce and affairs from the purchasing of a cargo of coal needed in the operations of the property, down to the insertion of an advertisement in the morning paper; from the hiring of a janitor's assistant, through all the various occupations, trades, and professions, and the innumerable grades peculiar to each, up to the employment of a surgeon to dress the broken limb or maimed body of some luckless tramp caught between the company's cars.

The disbursements of the railroad companies are the life-blood of many important trades, and help, to a greater or lesser extent, to aggrandize all classes and degrees of society. They may be likened unto the wide-spread branches of a gigantic tree, under whose generous canopy many widely separated industries find shelter and protection. These industries, so nurtured, animate in turn still others; these in their turn still others, until in the end every occupation known to man is benefited by them.

The disbursements of a railway company may be classed under two general heads — Permanent

and Incidental. Under the former we embrace those of a preparatory nature, such as are connected with the construction and building up of the property. Under the latter, those incidental to its operation when completed.

The Permanent disbursements are embraced in the accounts under the head of Construction, and properly include the entire cost of the property, its rights, privileges, and franchises, and all the expenditures incident thereto.*

The Incidental expenditures embrace Interest on the company's debt, its Dividends, Rentals, and Operating Expenses, the latter item including the taxes on the property.

The Operating Expenses include the cost of working the enterprise and the repairs and renewals necessary to maintain it in as good condition as when first completed, but they do not properly embrace improvements or additions.

It is of the minute characterization of the various disbursement accounts of a company that these volumes are intended more particularly to treat, and while arranging the items under headings more or less generally in use they will also attempt to describe the constituents of which the various accounts are formed.

*The cost of railroads sometimes appears in the returns of the companies under the head of "Property Account;" sometimes under the head of "Cost of Road and Equipment." It is customary with many companies to state the cost of rolling stock separately, under the general head known as "Equipment," and as this separation of the cost of the rolling stock from the cost of the road proper involves but slight expense, it would be well perhaps, if it were made a fixed rule.

In this description the delver in details will, doubtless, discover many omissions that he will esteem important. He will, for instance, in connection with the cost of working a property, not be able in many cases to do more than ascertain generally the various classes of items that constitute many important accounts; other omissions of a similar character will also appear as he progresses.

It will be the object, however, to make the description all that is required for general or particular use, and sufficiently thorough to convey, incidentally, to those not familiar with the subject, some general idea of the vast magnitude of a railway company's expenditures and their importance to the community.

A very large and respectable class of people — indeed I think I may say a majority of the people, have not heretofore considered our railway companies except as common carriers, formed of non-resident stockholders, illiberal in their tendencies, and short-sighted in their policies; aliens, so to speak, having no interests in common with the people; aggregations of capitalists leagued together for the purpose of profit, the suggestion of this profit being such rates as the interests of the company required without reference to the quality or worth of the service it rendered, the effect of the rates upon the community from which they are exacted not being a matter of interest or con-

cern to the owners of the property. For this misconception of the real facts in the case we are indebted to a class of professional writers who have access to the general ear, and who, through ignorance or design, or both, systematically misrepresent the intent and policy of the railroad companies.

The interests of the railway companies and the public are practically the same. No disaster can overtake the one without destroying the prosperity of the other, one can not reap substantial or permanent advantage except the other is correspondingly benefited.

The capital invested in our railroads is so vast* and so deeply rooted and fixed in perpetuity in the heart of the country that its owners are always the first to apprehend any disaster to the people, and are the first to discountenance any act the effect of which is to cripple or destroy the prosperity of those to whom they look for support, and without whom their property is valueless. Few classes of business represent in the same degree this phase of perpetuity that characterizes railway property. The great bulk of it has, it may be said, no value outside its immediate local purpose, and can neither be removed nor disposed of; this important fact, if no other, will forever

*It amounted on the 31st of December, 1878, (so far as it was then represented by issue of stock and bonds) to the very large sum of $4,590,048,798.00. The floating debt of railroads, in addition to the above, amounted to $183,248,566.—*Poor's Manual for* 1878, *p. vii.*

define and fix the conservatism of railway owners; their interests, if not their inclination, compel them to pursue, on the whole, an equitable policy towards those upon whom their property is dependent for its security and employment.

Another important fact in connection with our railways is very often forgotten or overlooked; namely, that their revenues, whatever they may be, are largely expended, as fast as collected, in the community from which they are derived.

A large part of the capital invested in railway property, as those familiar with the subject are aware, has never made any return whatever to its owners. The statistics that have been compiled on this subject are interesting and instructive. During the year 1876 there were, it appears, $1,953,938,344.00 invested in railroads in this country from which the owners received no return whatever;* in other words, the total earnings of this enormous mass of property were paid out in the community for wages and supplies, leaving nothing whatever for the investor.†

Fully sixty-four per cent. of the revenue earned by the companies who are able to pay

*_Poor's Manual_, 1877-78, _page xiv_.

†In 1879, 65 roads embracing 4,909 miles of track, represented by bonds and share capital amounting to $243,288,810.00 were sold under foreclosure. Of this large amount $80,000,000.00 was represented by shares, the value of which, in the majority of instances, was entirely destroyed by the process of liquidation.—_Railway Age_, _Jan._ 8, 1880.

"In the last four years about _one-fifth_ of the entire railway mileage and capital of the United States has been compelled to change ownership by forced sale."—_Ibid._

interest regularly on the capital invested in the property they own is expended as fast as it accrues, for labor, supplies and taxes in the community where it is received. The balance of the revenue is disbursed for improvements and additions to the property and for interest on mortgage debts and for dividends on subscribed capital. And in reference to the latter it is safe to say that the dividends declared on the funds invested in our railroads are not such as would satisfy investors generally, or men engaged in active business. Upon many lines no dividends whatever are possible,* while in other cases it transpires that the declaration of dividends are of infrequent occurrence and exceedingly small in amount.†

*"Ten companies with $4,443,888.00 permanent investment had no net income."—*Mass. R.R. Com. Report*, 1878. p. 8.

"The operating expenses, interest and rental of twenty-one roads exceeded their gross earnings, making a total deficit of $3,789,526.69."—*Michigan R.R. Com. Report*, 1876. pp. 4, 5.

"The amount of stock upon which no dividend was declared is $174,226,326.00."—*Illinois R.R. Com's. Report*, 1875, p. 12.

"For many years the stockholders in Wisconsin railways have been obliged to go without dividends, the surplus earnings being expended in permanent improvements."—Memorial of Presidents Albert Keep and Alexander Mitchell, 1875, p. 22.

"The only company reporting the payment of dividends upon stock is the Chicago, Milwaukee and St. Paul, who report the payment in 1876 of a dividend of seven per cent. on their stock for each of the years 1874 and 1875, *made in their consolidated sinking fund bonds at par.*"—*Wisconsin R.R. Com's. Report*, 1876, p. 7.

"But five of our companies report ever having paid dividends on their capital stock."—*Mich. R.R. Com's. Report*, 1876, p. 7. The report referred to enumerates 44 different companies.

†The Railroad Commissioner for Wisconsin, in his report for 1877, p. 11, says with great brevity, "Two companies only report dividends paid." The dividends in one case being 3½ per cent., and in the other 2½; and embracing only the preferential shares of the companies mentioned.

No dividends whatever were paid by Minnesota Companies for 1877.

In Michigan four companies were able to pay dividends during the year

A large percentage of the fixed and incidental expenses of a railroad company is made up of the wages paid by it to its immediate operatives. It is apparent, however, that the amount thus disbursed does not measure the aggregate benefit which the community derives from this source.

In addition to the large number of persons steadily in the service of our railroad companies, variously estimated at from four hundred thousand to five hundred thousand men, representing a population of from two millions to two millions five hundred thousand people, they give employment incidentally to a vastly greater number. These latter people are engaged in the preparation of the material and merchandise which the railway companies need, or are busied in supplying the wants of the railway operatives and their families.

The classes thus engaged may be said to represent, as do our railway operatives, the most industrious and frugal element of society.

The beneficiaries of the railway companies are discoverable in all the avocations of life from which men derive profit or renown: We find them

1877, being wholly on preferred stock except in the case of one company, which declared in that year a dividend of 2 per cent. on its common stock. *Report of Railroad Commissioner for* 1877, *pp. x., xi.*

"The total amount paid in dividends amounted to 4.68 per cent. on the entire capital stock returned." *Tenth Annual Report Mass. Railroad Commissioners, p.* 8.

The average dividend on the capital stock of railroads in the United States for 1878 amounted to 2 84-100 per cent. *Poor's Manual for* 1878, *p. ix.*

identified with our mercantile houses, in our workshops, in our printing-rooms, in the offices of lawyers and doctors: We find them in our petty supply stores performing the mean drudgeries incident thereto: They are to be found in our mines, upon our shipping, in our forests, and upon our farms. Our telegraph system is but an appendage to the railway interest, dependent upon it, and unnecessary, as at present organized, without it.

The vast armies of people engaged in these widely separated industries are vitally interested in the prosperity of the railway companies. They have, in their turn, still others dependent upon them, either directly or collaterally, and so the line is lengthened, and the connection of interest strengthened and broadened until it may be said to embrace civilized society as a whole.

Hence it is apparent that any thing that affects the railway interest injuriously, affects injuriously all other interests, the bond of sympathy between them being in all things complete and irrevocable.

Of railways as common carriers, and the unjust exactions to which they are sometimes subjected, the people engaged in furnishing the companies, and those dependent upon them, with supplies, are, as a rule, ignorant or profoundly indifferent. While the interests of these middlemen and their allies lie mainly with the expenditures of railroads, they do not stop to trace the close connection that exists between expenditures

and receipts, the cause and the effect. They do not stop to reflect that one is dependent upon the other; that to enable a company to buy supplies, and employ, at remunerative wages, the force requisite to its operation, it must be accorded facilities and equitable rates, otherwise it has not the necessary means.

However, to touch the pocket of the individual, is to awaken his conscience and enliven his understanding. We may therefore safely believe that, with the lapse of time and the progress of events, the self-interest of the public (largely made up of the middle class we refer to) will lead them to a just conclusion in reference to this particular question, namely, that a meddlesome and injudicious interference with the railway companies affects also their own interests as individuals.

When the public comes to fully understand this fact, as it ultimately must, we may also expect to see it appreciate the fact that the prosperity of the railroad companies must, to insure the individual welfare of its own members, be present and continuous, not spasmodic; that prospective profits are not sufficient; that our companies must not only have an income sufficient to reward their owners, but their earnings must be ample to meet all the necessary and reasonable expenses of operation and maintenance.

With the progress of knowledge and a better

understanding of the community of interest that exists between the people and the railroad companies, we may expect to see the former frown upon all hastily considered projects for interfering with the latter; they will resent unjust and demagogical criticisms of the acts of the railroad companies with the same unanimity that they would resent an attempt, whether open or covert, to break down the credit of our financial institutions, our mercantile houses, our manufacturing establishments, or any other interests forming an integral part of society and necessary to its comfort and prosperity.

As yet, however, the association of interest is but imperfectly realized. The connection that exists is too distant, too illy defined, to be readily understood in all cases. Hence the indifference of our manufacturing and other classes to the attacks made upon the railway interest. This indifference, as we have already stated, will cease when they come to understand more fully than they now do that the interests centered in the railway companies can not be destroyed or weakened without occasioning corresponding disaster in every other department of life.

Aside from, and in addition to, the classes already referred to as being directly affected by the disbursements of railway companies, there is still another and a constantly growing class, to whom this phase of the problem possesses a vital interest.

The class we refer to are the owners of the bonds and capital stock of railroads. These people are dependent to a very great extent for their comfort and support upon the interest and dividends which they receive from the companies in which they are severally interested. The holders of these securities embrace representatives from every branch of society; the active capitalist, the business man, the clerk, the trustees of estates, the managers of savings banks, widows, children, sewing women, and men who have retired from business. All classes, in fact, are the owners of these securities, from the great city banker to the half-starved family of the superannuated pedagogue, who have no source from which to supply their wants except that afforded by the small return made on the bonds or stocks which they own.

A default of the interest on these bonds, or a reduction in the dividend that is customary, means, to a majority of the holders, something more than an inconvenience: It means a sacrifice of property to meet present necessities; it foretells future anxiety, destitution, want.

It is impossible to trace the people or compute the number of those who are directly and personally interested in the growth and welfare of our railway system. They comprise, with those in sympathy with them, a large element—perhaps a majority of the people.*

*This fact seems not always to have been understood or appreciated by our railway owners in the unequal struggle which they have been waging

That the people so interested comprise a very large class is well known to those familiar with railway affairs. The immediate employes of our roads represent with their families in the neighborhood of six per cent. of our total population, as already stated. This percentage is not likely to decrease with the progress of time. In reference to the number of those indirectly dependent upon the railway companies no intelligent estimates can be formed. That their aggregate greatly exceeds those directly dependent upon the roads, including the owners and operatives and their families, it is not unreasonable to believe.

To those acquainted with the *minutiæ* of railway affairs it is apparent that no other capitalized industry, whether controlled by persons acting individually or in a corporate capacity, purchases so largely in the general markets of the country as do our railway companies.

These purchases, by their extent, stimulate industries which give employment to vast numbers of people engaged in the production, manufacture and sale of the articles of barter which the companies annually consume, and which are dependent upon their revenues for a market. And if we ascend a degree in the scale of employment we

with ignorance, fanaticism, cheap demagoguery, and downright dishonesty. The auxilliary support which they have in the people who are directly or incidentally bound up in the welfare of the railway companies, should, as a matter of prudence, be remembered by them, and utilized to its fullest extent whenever occasion renders necessary.

shall find that the railroad companies are the largest single employers we have of lawyers, doctors and civil engineers. The most accomplished attorneys in the land find steady or occasional employment in their service, and many of our eminent doctors and surgeons add largely to their annual income by the services they render to the railway companies located in the neighborhood where they live. Few indeed are the practitioners, whether of law, surgery or medicine, along our railroad lines, who have not at some period in their experience found both profit and professional distinction in the, to them, fortuitous circumstances that called them either temporarily or permanently into the service of some railroad company.

All the various classes of society we have referred to are personally interested, though in slightly different degrees, perhaps, in seeing that our railroad companies are not crippled or retarded in their progress by unwise interference with their affairs under the fallacious pretense of protecting the rights of the masses; and, when they come to see this, that they will ultimately make their interests and rights in the premises respected, no one can doubt.

CHAPTER II.

Railway Supplies — Their Classes and Variety — Many Railroad Companies large Manufacturers as well as Consumers — They Construct their own Equipment — Build their own Bridges, Depots and other Edifices, and attend to their Maintenance and Repairs — Mine their own Coal — Hew their own Wood — Erect their own Fences and Telegraph Lines, etc., etc.— The Trades and Professions patronized by Railway Companies; an Analysis of the Supplies Bought, and the uses to which they are put.

An accurate description of the articles of merchandise consumed in the active operations of a railway would embrace substantially every class of material known to the world of trade. This statement will seem like an exaggeration to the large class who are accustomed to look upon the articles consumed in the roadbed and upon the completed train as embracing practically all there is of the property; it is, however, substantially true, as we shall illustrate.

Many of our railroad companies are large manufacturers as well as consumers. They purchase the necessary material in the market, and remanufacture it as they require. Thus they procure copper and tin in ingots from the producers, and from these metals manufacture the brass

journal bearings used upon their engines and cars; from the refuse scrap collected along the line, or purchased in the open market, they manufacture the axles required for their cars; the articles of tinware used by them they frequently manufacture in their shops, and at a profit over the dealers' price. In the same way many of the fixtures used by them and much of the furniture to be found in their offices and buildings they manufacture from raw material, which they buy of the dealers in lumber and wood.

Some of the more opulent and progressive companies construct and furnish their own buildings, build their own equipment, repair the rails worn out in their tracks, have foundries in which they manufacture car wheels and the castings they require. They erect their own culverts and bridges, except when constructed of steel or iron, mine their own coal, cut their own wood in the forests, build their own fences, construct their own telegraph lines, and in fact perform all the functions of producers and manufacturers on a scale at once varied and extended.

Every thing belonging to a railway company needs attention and, save its lands, renewal from time to time.

Many companies deem it inexpedient, or find it impossible to enter the field as manufacturers of locomotives, cars and kindred articles; but all the larger and more prosperous corporations, with

hardly an exception, have the work necessary to keep their property in good condition performed at home by operatives of their own. So that while a company may not undertake the construction of its equipment, nevertheless when once it passes into its possession it as a rule, thereafter, attends personally to its preservation through the medium of its own operatives and appliances.

Aside from the supplies needed by a company for construction purposes, or required in renewing its old and worn-out property, it requires other articles of a more temporary character for immediate consumption. It would be extremely difficult as well as tedious to enumerate here the supplies classed under this last-mentioned head, but they embrace lubricants of all kinds, water, coal, wood, inks of various kinds, mucilage, stationery and kindred articles. The list embraces the articles of various kinds needed upon a railway for immediate consumption, from the packing material required in the journal boxes of its equipment to the writing fluid used by its clerks in transcribing the accounts.

Thus as the manufacturer of the article in the first place, or as its subsequent owner, it has occasion to use, to a greater or less extent, according to the magnitude of its property, all the coarse articles of ordinary consumption, besides the more common articles of merchandise, that

find lodgment in the warerooms and on the counters of our great mercantile houses.

Nor are its purchases confined wholly to such articles as are required for immediate consumption or for use in erecting or repairing buildings, mending machinery and kindred work. Its purchases enter every field where industry seeks occupation and profit. The jeweler finds in it a customer for his more valuable chronometers,* and each of its stations and ticket offices must be supplied with accurate time pieces; the jeweler at the same time finds in the men employed on the trains and along the line trustworthy and never failing customers for his watches. The vendor of diamonds finds in the railway company a limited consumer of his wares,† and the gold-beater finds in it a steady and profitable market for the product of his laboratory.‡

A railway company is a large consumer of silver and nickel, which it uses for plating upon its lamps, its window and door fastenings, and for the hand-rails and furniture of its cars.

It uses bronze for gilding in its offices, and upon its equipment. The bells upon its locomotives and at its stations, its car and switch-locks, the packing rings upon its engines, its steam fit-

*These are used for regulating the watches of conductors, agents, and others.

†Used by the glaziers, miners, etc.

‡The gold is used in ornamenting the panels and headlinings of passenger coaches, in ornamental lettering, and sparingly in adorning its offices.

tings, and locomotive trimmings, and its journal bearings, are made of brass.

Copper is used by it in the manufacture of flues of wood-burning engines, and its injector pipes and flue ends for locomotives are made of the same material.

It uses great quantities of tin for solder and in the construction of roofs for its buildings and rolling stock, and in the manufacture of oil reservoirs and cans, and in connection with the lamps used by its train and station men.

It buys, for the use of its workshops, lead in pig, in sheets, in pipes, and ceruse.

Its journal bearings and cylinder rings are lined with indestructible babbit metal, and it requires, in its operations, cadmium, zinc, mercury, and platinum.

Its track is largely made of steel, and steel forms an important element in the construction of its locomotive boilers, cross-heads, tires, crank-pins, smoke-stacks and tender springs ; its bridges, and its track connections, or frogs, and its tools and other implements are also largely manufactured of the same material.

The number of articles made of iron, or in which iron is a constituent, is quite as great, proportionately, upon a railroad, as in other enterprises: Or, in other words, iron outranks every other description of metal it has occasion to use. A railway company is a liberal purchaser of all

kinds of merchant iron. It uses cast-iron for its locomotive and car wheels, for its steam cylinders, steam chests, furnace grates, brake shoes, draw-bars, switches, and for many other appliances used in connection with its equipment and in its shops and depots of supply. Wrought iron is used by it in connection with its bridges and trestles, its axles, bolts, shafting, turn-tables, trucks, and for kindred purposes. It uses sheet iron for its engine boilers, its tanks, flues, smoke-stacks, stoves, pipes, and similar objects.

In attempting to classify the articles used by a railroad company in connection with its business, we find the most considerable purchases, as regards variety of object, are embraced, as might perhaps naturally be supposed, under the general head of Hardware. Its use for this class of merchandise embraces substantially all the articles to be found in a store devoted to the sale of such goods.

Under the head of hardware in use by a railroad company we notice many incongruous things, both as regards the nature of the articles and the quantity consumed. Thus, in the list of files we remark over one hundred different kinds in use, each kind having a separate designation and intended for a particular purpose in the economy of shop-work.

Under the same head we find such articles as pitchforks, garden rakes, spirit levels, closet hooks,

oil-stones, pincers, and match-safes, mingled indiscriminately with goods seemingly more appropriate to a sedate and practical railway company, such as screws, nails, spikes, files, locks, keys, hooks, axes, anvils, hinges and bolts; all kinds of tools used by carpenters, machinists, and trackmen; also springs, house and car trimmings, grindstones, chain, door and chest handles, and similar articles of hardware.

Turning to another branch of the service, many of our companies require wagons and horses for the active and economical conduct of their business. The disbursements on this account are exceedingly variable, extending, sometimes, not beyond an express wagon or top buggy. However, they involve for their equipment according to their variety and extent, much of the varied paraphernalia to be found in the wagon and harness shop.

In the supply rooms of a railway company we find every thing that a well regulated stationer has for sale — journals, ledgers, blank-books, letter-presses, paper, forms, pencils, pens, inks, erasers, weights, and such other articles as are required in a counting-house.

It requires for the use of its engineering corps, engine transits, levels, compasses, drafting instruments, chains, tape-lines, leveling rods, ruling pens, aneroid barometers, stencils, and all the accessories that appertain to them.

The disbursements of a railway company, however, are not confined wholly to articles of plebeian use, such as we have just enumerated. Its palace coaches and sleeping cars glisten with rosewood and French walnut; they are adorned with resplendent mirrors, with rich upholstery and brilliant curtains of satin and gold, while rare Indian rugs and costly Turkish carpets cover their floors. In its offices and waiting rooms and upon its ordinary cars the furnishings are but little less costly. Its purchases of this character it may be said are uniform and constant, and so considerable in amount as to form an important element in the business affairs of those who manufacture or sell articles of this description.

Its varied necessities make it a liberal patron of our dry goods and jobbing houses. It requires cloths and linens of various kinds in the manufacture of its bedding, car cushions, linings, curtains and for other purposes.

It uses woods of various kinds in vast quantities in connection with its operations. No other isolated enterprise in our midst contributes so uninterruptedly and so largely in this direction. Many great companies still use wood for heating purposes, and thus millions of cords of wood are annually consumed. Until the recent introduction of barb steel wire for fencing purposes the fences that protect our railway tracks were

built almost wholly of wood:* Its ties are still manufactured entirely of that material, and no attempt whatever is made, except in isolated instances, to preserve them from decay by creosoting or by other processes so familiar to railway companies abroad. Its buildings, bridges, culverts and road crossings are also constructed largely of wood.

In many instances little or no regard is paid by our companies to the quality of the material purchased ; the lighter or softer kinds of wood being sought in preference to those of a more durable character, not because they are cheaper, but because they can be bought for less. All the higher grades of wood, however, are used to a greater or less extent by a company ; it uses oak for the frames and sills of its equipment ; rosewood, walnut, maple and cherry are used in the interior of its palace cars, and in its coaches and offices ; the handles of its tools are manufactured of hickory, and its track gauges are constructed of seasoned ash.

Our railway companies vie with our merchant-marine in the purchase of hemp, manila and wire rope for use in their depots and at their shops, and upon their trains and wrecking cars.

They consume vast reservoirs of oil of various kinds in lubricating and cleaning their equipment and machinery, in mixing their paints and in light-

*In England well-kept hedges line the road on either side.

ing their rolling stock, stations, offices, and signal lamps.*

They have constant occasion to employ glue and other adhesives upon their equipment, and in the construction of their buildings and the office furniture belonging thereto.

They require for cleansing and polishing their machinery and equipment emery, emery cloth, emery wheels, kriolite, oils, oxalic and other acids, waste and kindred substances.

They disburse large sums annually for rubber for springs, for use in packing the pistons of engines, for gaskets and for hose pipe and other purposes.

They consume large quantities of stone, brick, lime and cement in connection with their bridges, culverts, buildings, turn-tables, track-scales, arches, docks, and in other ways.

The hotel cars, eating houses, lunch rooms, and vessels owned by our railway companies require for their successful operation and maintenance all the varied necessities of a well-appointed public house; these necessities may be said to comprehend the furniture peculiar to hotels, an extended assortment of china, glass ware, cutlery, silver and plated ware, and articles of a kindred nature; incidentally they include tobacco and

*The more common kinds in use are lard, tallow, natural Virginia oil and their compounds for lubricating purposes; petroleum, sperm, lard and their compounds for illuminating; linseed oil for paints and for preserving and polishing woods, and neatsfoot oil for dressing leather, etc.

cigars, with all the various kinds of native and foreign liquors.

The cuisine attached to their hotel cars and dining saloons contain every variety of article that can tempt the palate or stimulate the appetite of the jaded traveler. Tender and juicy meats, rare game of every kind, rich sauces, pungent spices; salmon from the Columbia River, blue fish from the great South Bay, and trout from the cold waters of the Mackinaw; bread made from Minnesota flour, butter manufactured in the creameries of Orange County, carefully selected and succulent vegetables, potatoes grown in northern Wisconsin, celery, crisp and white, fresh from neighboring hot-houses, delicate fruits brought from countries beyond the seas, apples grown in Michigan, peaches from the banks of the Chesapeake, oranges from Florida, grapes from the vine-clad hills of California, figs from Guatemala, and almonds, nuts, and raisins, from the countries bordering on the Mediterranean. Its closets and ice chests contain wines from France and Germany and the vintages of our own country; rich ales brewed in Burton-on-Trent, London porter, strong Dublin stout, bottled lager of our own make, whiskies from Kentucky, choice brandies, aromatic bitters and medicinal waters of every kind.

In the operation of the telegraph system our companies consume large quantities of the material peculiar to that branch of business, namely,

plain and insulated wires, the poles upon which the wires are strung, various descriptions of submarine cables, blue vitriol, acids of different kinds, mercury, platinum, zinc, all the various patterns of magnets, relays, sounders, registers, insulators, and switches.

The successful and economical operation of a railroad company requires it to make use of every instrument whereby time and expense may be saved. We discover its disposition to economise in various ways; we see it in the use of the best kinds of machinery, in the use of the latest improvements of every description, and in the use of such labor-saving instruments as the telephone, papyrograph, electric pen, duplicator, hektograph, lithogram, type-writer, and kindred appliances.

The quarries and mines of our railway companies require for their efficient development all the appliances peculiar to such enterprises; powder, nitro-glycerine, and other explosives, besides the tools and fixtures that modern ingenuity has invented for such purposes.

In preserving and adorning its furniture and buildings, and in protecting its bridges and equipment, and in connection with its signals, machinery, and tools, it has occasion to make liberal purchase of all the various kinds of paints, oils, varnishes, and like substances for sale in the markets of the country.

In connection with the making and repairing

of its cushions, curtains, bedding, carpets, matting, flags, and for other purposes, it requires needles, thread, etc. With these we find associated thimbles, beeswax, hooks and eyes, pins, buttons, etc., etc.

The disbursements for material comprehend an infinity of things. A company may be said to have use, either directly or incidentally, for nearly every species of article known to manufacturers and traders. It keeps in its store-houses, subject to requisition, silver pearl rouge, washing powder, sulphur, soap, toweling, mirrors, dust pans, mouse traps, black manganese, molasses, torpedoes, stove polish, salt, candles, and many other articles* that we would hardly expect to find in the supply store of a railway company.

*Such as nippers, bung-borers, garden rakes and hoes, pitchforks, porcelain wash bowls, wheat, bran, mops, brooms, baskets, sprinkling cans, calf-skin, webbing, gimp, curled hair, napkins, blankets, mattresses, table cloths, counterpanes, tea, coffee, sugar, beans, rags, slates, slate pencils, candles, filters, fire-extinguishers, bunting, canton flannel, prepared chalk, soda, sal ammoniac, sieves, chamois skins, libraries, bible racks, pumice stone, cotton cloth, carpet tacks, antimony, plumbago, rotten-stone, tripoli, mica, sea-grass lines, wind-mills, tents, maps, atlases, directories, counterfeit detectors, mail bags, carpet sacks, trunks, and many other surprising things that will be found in the list of articles embraced in Appendix B.

CHAPTER III.

Organization or Construction Expenditures — The Funds largely Contributed by Foreign Capitalists — The Results of the Enterprise accrue to the Benefit of the Local Community — The Magnitude of Construction Expenditures — What the Community Contributes in Return for the Benefits it Derives — The Magnitude of the Incidental Expenses disbursed in the Community — Organization Expenses — Cost of Charter — Preliminary Surveys — Stock Subscriptions — Mortgage Expenditures — Interest on Advances during Construction — Cost of Right of Way — Fictitious Valuation of Land — Expenditures for actual Construction — Grading — Ditching — Bridging — Tunneling — Tying — Track Laying — Buildings — Fences — Telegraph Lines, etc. — Expenditures for Equipment and Supplies — Diversity of the Relative Cost of Railroads — Cost of European Roads — Railway Property never Fully Completed.

The funds disbursed in a community in connection with the construction of a new road are largely, if not entirely, made up of foreign capital; but little of the capital used for this purpose being contributed by the country through which the line passes.

Nevertheless all the local interests that cluster about the new enterprise gather the rich fruits that follow its introduction.

These benefits are apparent in the opening up of the country to the traveling public, in the increase of the population, in the inauguration of industries, temporary and permanent, previously unknown in the community, and finally in the appreciation of values of all kinds, including the land in the vicinity of the new enterprise.* The community, in other words, derives all the benefits that follow the expenditure of enormous sums of money in its midst for the construction of railways without itself adding any thing materially to the contribution.†

The capital disbursed in connection with the building up of a railway being provided by per-

*In reference to the enhancement of values consequent upon the introduction of railways in Great Britain, Sir Rowland Hill says (Royal Com. p. cviii.) "The possessors of land and other fixed property in all districts traversed by railways have been enriched by the increased value of their possessions to the extent, probably, in many instances of fourfold."

While the increase in the British Isles may not have exceeded Sir Rowland's estimate, still it is believed to fall considerably below the appreciation realized by property owners in the United States; the explanation of this difference it is hardly necessary, perhaps, to state, was occasioned by the greater extent of our country, its comparative newness, and the meagre facilities it enjoyed, previous to the introduction of railways, for inter-communication between different states and sections.

†The disbursements of railroads in the United States for construction purposes as expressed by their capital stock and funded debt is given by Mr. Poor, at considerable length, in his Manual for 1878, pp. vi., vii., as follows:

New England	$293,645,183.00
Middle	1,416,630,257.00
Southern	466,728,584.00
Western and S. Western	1,992,582,187.00
Pacific	147,112,590.00
Pacific Railroads	273,349,992.00
UNITED STATES	$4,590,048,793.00

sons residing away from the enterprise, it follows that it adds so much to the local wealth of the country where the disbursement occurs.

This accession of wealth, this introduction of new enterprises, this enhancement of values and increase of population the community receives in consideration of certain rights, real or supposed, which it relinquishes when it permits the companies to occupy and possess themselves of land duly purchased and paid for by them.

After a railway property is completed and in operation the funds necessary to meet its incidental expenses should, if the organization is in a healthy condition, accrue from the transportation services performed by it.* In other words, the earnings of a company should be sufficient to meet the expenses incident to its operations, including a fair dividend on its capital. When this is not the case the people will suffer (in common with the stockholders) in the accommodation afforded it as well as in the depression that always follows the unprofitable placement of the surplus capital that is at the disposal of the community.

While the first cost of a road is in the nature of new capital brought into the community it benefits, the revenue this capital derives subsequently from the services it performs is returned,

*I of course leave out of consideration here those enterprises (the result of rivalry and a too precocious ambition) happily now growing each year more rare, planned with a view to future rather than present gains.

either wholly or in part, to the community from which it is temporarily withdrawn.*

This return is made in the shape of taxes for the support of the Government, for the services and expenses of persons in the employ of the railway company, for the supplies of all kinds used by it in its operations, for the improvements and additions to its property for which a large outlay is annually required under the most favorable circumstances, and finally, as interest and dividends on the capital invested.†

The amount a company exacts for its services is thus re-conveyed, in another shape, back to the community from whence it is drawn.

*"The cost of operating the railroads of Massachusetts for six years ending with 1878 was 69½ per cent. of their gross receipts." *Mass. R. R. Com's. Report for* 1878, *p.* 7.

"A comparison of operating expenses, with earnings for the time, since returns have been made to this office, shows the percentage of operating expenses to earnings to have been, for 1873, 66.69 per cent.; for 1874, 66.54; for 1875, 71.28; for 1876, 66.07; and for 1877, 64.74 per cent." *Report of the Commissioner of Railroads of the State of Michigan for* 1877, *p. vii.*

"In Ohio for 1874 the operating expenses were 72 9-10 of the receipts." *R.R. Com's. Report, p.* 20.

"Total operating expenses is 69 9-10 per cent. of all the earnings." *Report of Com's. for Ohio, for* 1870, *p.* 46.

"The operating expenses for the year have been 79 4-5 per cent. of the gross earnings." *Minn. R.R. Com's. Report*, 1873, *p.* 24.

"The percentage of operating expenses to earnings was 71-28 per cent. of the earnings." *Mich. R.R. Com's. Report*, 1876, *p.* 4.

"The operating expenses of railroads in the United States for six years ending with 1876 were 63 9-10 per cent. of the total revenue." *Poor's Manual*, 1877, *p.* i.

The amount disbursed by railroad companies, as shown by the foregoing, does not include expenditures for enlarging and extending and improving their roads; and in so far as they do not do this, they fail to exhibit the actual disbursements of the railroad companies in the communities where they are located.

†The amount of the incidental expenses (not including construction work) for one year is given by Mr. Poor in his Manual for 1879, pp. vi., vii. were $459,318,064.00.

These simple and suggestive facts recur to us more and more frequently as we pursue our subject, and it can do no harm to call the attention of the public to them here, in connection with the railway problem, so called. However simple and apparent they may be to the owners and managers of railroads, they do not receive from a large class of people the consideration they merit.

In attempting to describe the disbursements of railroads, those having relation to the cost of the property are naturally the first to receive attention. The expenditures on this account embrace several distinct objects, all directly subservient, however, to the main purpose of the enterprise. Let us take up these expenditures as nearly as possible in the order in which they occur.

And first we may notice the cost of the necessary charter or permit to build, the outlay for legal advice, notarial expenses, the company's seal, and items of a corresponding character.

The disbursements on this account vary greatly with different companies. In some of our States the local constitution requires that a company shall procure a charter from the Legislature. This charter is nothing more nor less than a law, duly passed and approved, specifying the duties and privileges of the railway company, and the territory it may occupy. This is the manner of procedure generally followed in England. In some of the States of the Union the organic law

requires a railway company to organize under a general statute, and any number of companies may be organized by complying with this general statute, which is very simple and inexpensive in its workings. Manifestly the cost to a company is much greater where a charter is required than where a permit only is needed, though the special benefits obtained under the first-named plan seemed at one time to more than counterbalance its increased cost over the other.

Where a special charter is required, the expenses incident to it may be said to vary in proportion to the necessity for the proposed road, the fidelity and skill with which it is pressed upon the Legislature, and finally the industry and good intention of the latter body. In any event, the law that the incorporators require must be drafted, and men skilled in the arts of legislative practice must be employed to present it. This necessitates, directly and incidentally, a considerable outlay.

Where the organization proceeds under a general law, the company has only to perfect its arrangements in conformity therewith, and file for record the papers required under its provisions. In return it receives from the officer appointed the formal permit required by the statute.

After the procurement of a charter or permit to build, the amount it is necessary for a company to disburse in order to perfect its organization is comparatively small. However, it forms a part of

the cost of the property, and is therefore placed to its debit with other items of greater consequence.

Preparatory to the location of a railway line, one or more preliminary surveys are made. It is sometimes necessary to explore several routes before it is possible to decide intelligently which has the greater advantages, or, to put it differently, which one is the least objectionable. This labor requires time and skill, and involves the expenditure of a large sum of money. Under the most favorable circumstances, the work of locating a property, if conducted intelligently and with a view to the ultimate outlay that is dependent upon the final decision of those in charge, requires the exercise of patience and a nice judgment. Not only must the engineer prepare a general description, or profile of the different routes, but he must determine the approximate cost of the permanent structures, embankments, cuts, tunnels, bridges and culverts; the amount and quality of the earth that must be moved, and the distance it must be moved; the cost of track and other supplies, including ballast, at the point where required; and, finally, he must enumerate the grades and curves, and the maximum load that may be hauled in either direction over the whole line and over its different sections.

The expenditures on account of the surveying parties sent out by a company involve disbursements for the implements required, for the wages

of the men employed, for the clerical and supervisory force required at headquarters, and, finally, for the expenses of the men while in the field and while going thereto and coming therefrom.

This outlay belongs to the engineering department of a company, and as the supervision of this department over the work in progress continues uninterruptedly until the final completion of the property, or its inauguration, it follows that the disbursements to be made under its direction are regulated by the extent of the work, the difficulties to be surmounted, and the faithfulness with which the service is performed.

While the surveying parties are still engaged in perfecting their labors, or preliminary thereto, all the disbursements incident to the construction of the road must be considered by the directors.*

Their deliberations on this account will ultimately find expression in the placing of a mortgage on the contemplated property, or in the manufacture of certificates of shares in the capital stock to be used as occasion requires. It is quite likely that it will be necessary for them to make use of both of these methods before the road is finally completed and equipped.†

*A company can not be organized, under any circumstances, until a certain amount of its capital stock is subscribed for; the percentage of the stock subscribed that must be actually paid into the company's treasury, within a certain time, as fixed by law, varies in different States.

†Indeed these methods are very frequently supplemented in the United States by a large floating debt.

The disbursements incident to the preparation of the mortgage and certificates of shares, and the placing of the same in the market will be found to vary greatly with different enterprises. In the disbursements on this account we should embrace any discount a company may suffer from the par value of the bonds and shares it sells, also all commissions, exchanges, and expenses it is compelled to pay in connection with the sale or delivery of such bonds and shares.

The discount suffered in the sale of the securities of a new and uncertain enterprise forms, in many cases, the most important item of expense to which it is subjected in procuring the means necessary to carry forward its projected improvement. The amount of this discount will depend, as those familiar with such matters are aware, upon the probable value of the proposed property, the condition of the money market, the character, surroundings and wealth of the men in charge of it, or the strength of the company that guarantees the payment of the interest or principal when due.

Aside from the disbursements for exchange, commissions, and discounts, the introduction of new shares or mortgage bonds does not involve any important outlay. The preparation of the certificates of shares or mortgage bonds, and their registry in accordance with the law and commercial usage necessitates the employment of agents

especially conversant with such matters; the compensation of these agents and the expense of printing and registering form the only noteworthy items that the account embraces.

In connection with the class of disbursements just mentioned, and analogous to them, should be mentioned the interest on the money invested in the property while the enterprise is in course of construction and before it commences to earn a return; the amount of this interest during the preparatory period, on the advances of the proprietors, forms a part of the disbursements on construction account, and must not be omitted in any attempt to ascertain the cost of the property.

Up to this point it appears that nothing of tangible value in itself has been contributed to the property, although the disbursements of the proprietors of the enterprise have been continuous, varying in their magnitude only with the extent of the line and the obstacles to be surmounted.

We next come to the outlay that the owners are compelled to make in connection with the right of way, and the grounds that the company will require for its station houses, supply depots, shop buildings, yards, gravel pits and sidings.

In connection with the procurement of the realty a company requires, peculiar agents will be needed by the company, agents withal of approved integrity and discretion, as the successful fulfilment of the duties required of them will necessi-

tate on their part the utmost method, patience and tact.

Except in isolated cases it is the experience of every railway company that the value put upon the land which for any reason it is compelled to buy, either at private sale or by act of public condemnation, is fixed at the maximum price, and this price, it must be remembered, is based upon neighborly interest and local gossip, and not upon *bona fide* transactions in the article itself.*

*This is probably the case in every country where railways are built except in those cases where the appraisement is made by disinterested and capable officers of the general government. The same disposition to exaggerate the value of property required by railway companies observable in this country has been the subject of frequent public complaint in Great Britain. Sir R. Hill, in his report already referred to, p. cxiv. says: "In the purchase of land for railway purposes the amount actually paid is, as already stated, often several times the antecedent value."

Mr. A. Sinclair, C.E., in his interesting notes on British railways says, in reference to the excessive demands made upon the English Companies for the land they require and for land damages, "In the cost of British railways, right of way has proved an expensive item. As the land is mostly divided up into large estates, a company negotiating for right of way has not a multitude of property holders to contend with. But if the land owners are few, they are perfect Trojans to fight for compensation. There is a curious laxity of principle among a great many people in their dealings with railway corporations. Noblemen who are popularly credited with the possession of sentiments as elevated as their titles, clergymen with reputation spotless as their neckties, have been known to swear that a railway going through their grounds would inflict an amount of damage exceeding the market value of their whole estates. In the aggregate, right of way has cost $35,000 per mile. When we reflect that in Scotland, the North of England, and In Ireland, long stretches of almost worthless moors have been traversed by the railway system, it will be perceived that enormous compensation has been paid for some portions of the land used. When the London and Birmingham railway was projected, nearly every landowner on the route selected was antagonistic to the line. And what the directors considered the hardest feature in the situation was that these same landowners sat as judges on the application for a bill in the parliamentary committees. It was, as a matter of course, rejected after costing the promoters, say $160,000. Before the succeeding session of parliament a system of conciliation was instituted with the noble lords and influential landed proprietors whose opposition was bought off by extravagant prices for their land. The

In the practical operations of a railroad it is noticeable that the efforts of a company in the procurement of the land it requires are not directed so much to the securing of the land at less than its worth as to escaping the payment of fictitious values.

The expenses in connection with the purchase of the realty a company requires, aside from the cost of the realty itself, can not be determined ordinarily with anything like approximate accuracy until the completion of the enterprise. In new or sparely settled districts the number of transactions is lessened, and, in this country, the general desire of the community to have roads constructed has, heretofore, rendered its individual members quite tractable. In those sections of the country where the population is dense and possessed of considerable wealth the harassment and expense to which a company is frequently subjected for juries, commissions, arbitrators, experts and witnesses, for the purpose of determining and fixing upon the price to be paid for the land it requires, is a severe tax upon the most hopeful enterprise; the outlay being as great sometimes for a strip of ground a few feet in width as it is in other cases for a piece of land that will carry the proposed line half way across a county.

right of way cost three times the estimate, which originally was very high. This was an illustrative case. Many of a similar character will be related when a full history of railway construction in Great Britain comes to be written."

To avoid the imposition that will otherwise be practised upon them, the more experienced among our railway companies do not, as a rule, when they can avoid it, locate definitely the lines contemplated by them until the realty they require in connection therewith has been definitely contracted for; by pursuing this course the acts of downright injustice that would, under other circumstances, be visited upon them in many cases is entirely avoided or partially alleviated. It may be said, in connection with this subject, that those in charge of the procuring of the right of way that a company requires can not be permitted too wide a discretion to enable them to secure the most advantageous terms possible from the owners of land. It will be the policy of these agents, as it is of the company employing them, to represent that the location of the line is dependent (as it should be) upon the facilities afforded and the amount that must be paid by the company for right of way, depot grounds, yards, damages, etc. Under a method of procedure so discreet and far sighted as this the property owners along the proposed line will quickly perceive that the benefits to be derived from the contemplated enterprise are directly dependent upon the reasonableness of their claims, and this knowledge will serve to encourage the more conservative, while it will act as a repressive or a deterrent with the more rapacious and unscrupulous members of the com-

munity, and in so far as it does this will inure to the benefit of the company interested, and to the community at large as well.

The disbursements for notaries, registers, attorneys, abstracts, blanks, and kindred items, help to swell the cost of a company's realty. Aside from such necessary but unproductive expenditures, it must pay the salaries and expenses of the agents engaged in procuring the ground required. The outlay for the salaries of these men may be determined approximately in advance of an enterprise, but this is not possible with their expenses, as the latter embrace a multitude of details that vary in their number and dimensions with different locations, periods, and circumstances.

The disbursements of a railway company for right of way, and such other realty as it requires, are rarely, if ever, closed at the time of the completion of the line. Years sometimes elapse before the proceedings in courts and the negotiations that are being carried on privately are finally brought to a close, and the requisite deeds for the property are made and delivered.

When it is impossible for a company to come to an amicable understanding with the owners of a piece of property needed by it, in reference to the price to be paid, proceedings of condemnation are usually instituted in accordance with the laws of the State.* The work of building the

*These laws, in many cases, in the majority of cases, indeed, I think I may say, are exceedingly loose in their construction and manner of opera-

property, however, progresses, leaving the final settlement of the question of compensation to be determined through the slow processes peculiar to courts of justice and boards of arbitration.

The disbursements of a railway company for construction purposes increase in volume from day to day as the work progresses. At first small and infrequent, they grow in number and magnitude with the lapse of time, just as a storm progresses from the few preparatory drops of rain to the blinding tempest that follows.

With the active inauguration of the work of construction, the proprietors are called upon to meet the cost of grading, the cost of ditching and protecting the road-bed, the building of bridges, the construction of culverts, the boring of tunnels, the raising of embankments, the clearing of impeding objects from the right of way, the excavation of the hills and mountains through which the line passes, the construction of dykes, the placing of the necessary cross-ties, the laying of the rails, and, finally, the ballasting and surfacing of the completed track. Concurrent with these expenditures, or following them, the work of constructing fences, telegraph lines, depots, platforms, sidings, engine houses, workshops and machinery

tion. Thus, instead of contemplating the appointment of impartial commissioners, selected by a responsible court, from men of high character and not in any way interested or prejudiced, they permit the appointment of arbitrators from neighboring land owners, and from the immediate friends of the property holder.

and supply depots, progresses with more or less activity and expense. Finally the vast panorama of disbursements is closed for the time being, by the purchase of the necessary furniture and fixtures for offices and buildings, and by the procurement of the equipment and supplies incident to the inauguration of a railway and necessary to start it in successful operation.

All of the various expenditures that we have enumerated, or that they suggest, form a part of the cost of a property, and properly appear in the returns under the head of construction.

In reference to the labor incident to the grading of the road bed of a company, the clearing of the right of way of impeding obstacles, the digging of the requisite side ditches, the building of the culverts and smaller bridges that are necessary, and the putting down of the cross ties and rails, this work is in some instances performed by the immediate operatives of the company owning the property, but more frequently it is performed by contractors who stipulate for sections, varying in length according to the dimensions of the property and the nature of the work. At one time it was the favorite practice to let the work in small contracts, but this custom has latterly given place, in consequence of its greater simplicity of execution, to the practice of letting the work only to contractors of large experience and means, who can

furnish adequate security for the faithful carrying out of their agreements.

The cost of railroads per mile varies greatly in different localities and under different circumstances, as we shall explain somewhat more fully further on. The cost, above all, is affected by the profile of the country traversed, the character of its soil, the cost of supplies at the point where needed, and the number of streams to be crossed, and their dimensions and peculiar character.* A material thing in connection with the cost of a railroad, as we may readily believe, is the price agreed upon or adjudged for the land occupied, and by the character of the road itself.†

We have unfortunately, no recent or perfectly trustworthy statistics as to the cost per mile of railways in Europe, but from such information as we have at hand it is apparent that it is greatly in excess of that of our own roads.‡

*This last mentioned feature in the history of railroad property is very happily illustrated in the report of Mr. S. S. Montague, chief engineer of the Central Pacific R.R., in reference to a change in the channel of the Yuba river, whereby his company was compelled to make expensive alterations to meet it. He says:

"Changes are taking place in the regimen of many of the streams crossed by your lines, notably the Yuba River at Marysville. The channel of this stream has been filled to a depth of twenty or more feet in many places, and at the point of crossing by the railroad, it has shifted its position several hundred feet since the construction of the bridge, the main channel being now near the northern or Marysville bank. Two additional spans were constructed last year to provide for this channel, and it is probable that a further extension will be required." Report Central Pacific R.R., 1878, p. 48.

†According to Poor (Manual for 1879, pp. vi., vii.) the average cost per mile of the railway lines in the United States is $52,972.84.

‡In Belgium the cost is $106,968 per mile (Rys. [Irel.] Commission, p.7). In Great Britain the 15,813 miles of railway had up to 1872 cost an average

The great difference in the cost per mile between the railroads of Europe and those of the United States is occasioned in part by the enormous expense to which the former were subjected for purposes of right of way and station grounds. Thus in Europe the railway companies found the land all occupied, and the great bulk of it highly improved, while in the United States vast tracts were still uninhabited, or practically so, when first occupied by the railway lines, and herein lies the secret of the great difference in the cost to the railway companies in Europe and at home of the right of way and the lands required by them for other purposes.

The difference in cost is further explained by the fact that the European roads were constructed, in the first place, in a more permanent manner and with greater reference to their future wants than the poverty of our companies rendered possible.

The difference in cost, or the apparent difference in cost, (for, at the present time, much of it outside the cost of the land used is only apparent,) between our roads and those of Europe is owing largely to the difference in the method of book keeping pursued by each. In Europe every thing

of $180,000 gold per mile. (Railway returns, England, Wales, Scotland, and Ireland, p. iv.) Germany had up to 1863 $92,446 per mile, in Austria the State railways up to 1863 had cost an average of $96,680 per mile; in France the 9,014 miles of railway up to the year 1867 had cost $194,860 per mile.

belonging to property account is scrupulously charged under that head, and the companies interested exercise the greatest vigilance to see that no item affecting the cost of the enterprise proper is omitted or charged under a different head. In this country, on the other hand, a large part of the construction expenditures of our roads are embraced, as we shall take occasion to explain more fully further on, in the accounts of the companies as operating expenses, or are charged directly to the profit and loss account. Many of our companies have been especially lax in this respect, and their neglect to increase the value of their property upon their books and in their accounts, in accordance with the disbursements actually made by them for purposes of construction, can not but result ultimately to the serious disadvantage of the owners of the property.

The property of a railway company, it may be said, is never fully completed. New wants are constantly suggested by the requirements of business and the discoveries of better appliances, these involve an outlay that continues with more or less uniformity so long as a property is operated.

The total disbursements of our companies for purposes of construction can not now be accurately determined. Upon few or none of the lines is it believed that the cost of the property is fully represented by loans and share capital; consequently any figure professing to exhibit the cost when based

upon such data is untrustworthy. Poor fixes the cost of our railroads at $4,166,331,921,* but the disbursements have undoubtedly been much greater.

A summary of the principal items required for the operation of one hundred miles of an average single-track road, affords a fair indication of the magnitude of disbursements for purposes of railway construction, and we can not do better than append them to this chapter. The average plant in the United States we find to be 20 locomotives, 15 passenger cars, 5 special cars, 495 freight cars.† In addition, there are reputed to be 15 depots, 1 repair shop, 2 round-houses, 4 turn-tables, 30 switches, 30 frogs, 265,000 cross-ties, 70,400 splices, 3,100 kegs of spikes, 140,800 bolts and nuts, and the same number of washers, 3,432,000 feet of fence material, and 11,578 tons of sixty-pound iron or steel rails.

This inventory, it will be remarked, takes no account of the land required, the general and departmental buildings and offices needed, the machinery, furniture, and fixtures, that must be provided, or the supplies that must be purchased. It makes no mention of the telegraph apparatus, the bridges, culverts, watch-houses and depots of supplies, nor of the multitude of petty things re-

*Poor's Manual for 1879, pp. vi., vii.

†Poor's Manual for 1878, p. ix.

quired, and without which a road could not be operated.

In all of these disbursements the community are interested, and all classes are favorably affected by them, from the miners and mine owners of Pennsylvania and northern Michigan, to the dealer in pins and pin-cushions in the little State of Connecticut; from the manufacturer and dealer in scientific instruments at Amsterdam, to the horny-handed son of toil, who, in the far West, plows his own field and gathers, unaided, his own harvest.

CHAPTER IV.

Cost of Construction — The Cost of Construction Governed by the Character of the Enterprise — By the Ability, Experience and Fidelity of the Managers — By the Condition of General Business — By the Seasons of the Year — By the Profile of the Country through which the Road Passes — By the Value of Surrounding Property — By the Volume and Character of the Traffic it is designed to Accommodate — The Amount of the Traffic of a Line Distinguishable at a Glance — Roads Constructed for purely Local Purposes — Their Characteristics — Railroads Built for the Purpose of Making Money out of their Construction — The Evils Resulting from such Enterprises — Adaptation of Property to its proposed use.

In the preceding chapter we have described at considerable length the different classes of expenditures that occur in connection with the construction of a railroad. We may now consider the subject from another point of view.

The disbursements of a company for construction purposes are governed by the character of the road, the nature of the country where it is located, its distance from the base of supplies, the kind of business it is designed to accommodate, the quality of the material consumed in building, the ability and experience of the engineer in charge, and the skill and fidelity of its managers in mak-

ing its contracts and buying the real and personal property it requires.

The cost per mile is never possibly the same upon different lines.

The road that is built during the time of inflated prices or during great business activity will cost more than if constructed in a time of depression, when prices of all kinds are comparatively low.

Some seasons are more propitious for work of this description than others. The section of road constructed during the Summer months is usually less costly than the line built during the intermediate period between Summer and Winter. The work is also of a more satisfactory character, and the cost of operating afterwards is less.*

In the majority of instances the location of a line fixes absolutely its relative cost. Thus the road that may be built for a few hundred dollars per mile in Nebraska, with its peculiar soil and monotonous level, and its cheap lands, would cost millions of dollars in New York City or its immediate suburbs. In England the cost of a railroad is said to vary from $20,000 per mile to $5,000,000, according to the district in which it is located.†

The extent of a property and its quality also

*In contradistinction, however, to this rule, I have known of frequent instances in the construction of railroads in low and marshy sections where the preliminary work of clearing the right of way and getting the material for the road in position was only possible during the Winter months, when the surface of the ground was frozen hard.

†*Roy. Com'n. on R. p. xliv.*

affects directly the outlay it involves per mile. The difference in the cost of railroads is as variable, it may be said, as the price of land in different sections or in different stages of improvement or cultivation. "The highest cost per mile of road in the State is that of the West Wisconsin, which is given at $57,086.45. The lowest being that of the Galena and Southern Wisconsin, which is given at $15,244.18." *

A broad gauge road is not only more costly to build than a narrow gauge line, but its machinery and equipment are correspondingly expensive. And in the same way a road constructed to accommodate a large traffic has necessarily more elaborate and expensive facilities than a property built to accommodate a light business.

The traffic that must be hauled to market over heavy grades requires larger and more costly engines than are necessary upon a line where there are no grades to be surmounted; the cost of constructing the road is also less in the latter than in the former case.

A road that is built for the purpose of transacting a particular business is or should be constructed with that object in view.

The nature of the traffic a road is designed to

* *Wis. R.R. Com'a. Report*, 1876, *p.* 5.

"Between the average cost per mile of the Northwestern and the valuation of the Milwaukee roads, not very unequal in apparent cost, the difference amounts to $19.267 per mile, a little more than the total reported cost per mile of the Green Bay and Minnesota Railroad." *Wisconsin R.R. Com'a. Report*, 1874, *p* 22.

accommodate may be said to be apparent in the character and cost of its equipment, and in the nature and extent of its station facilities.

The locomotives of a company busied exclusively in transporting freight are different in construction and cost from those of a corporation engaged wholly in the passenger traffic or in business of a general character.

The road bed, superstructure, equipment and machinery of a line doing a small business may be lighter in weight and consequently much cheaper than would be either advantageous or profitable on a line where the traffic is large.

The cost of the facilities required for different kinds of traffic are never the same.

A company engaged in transporting coal and ore requires cars different in construction and price from those of a company engaged in hauling merchandise of a miscellaneous character.

The necessities of the passenger business are altogether different in their character from those of the freight traffic, and the cost is consequently different.

The relative cost as between the freight and passenger business is influenced by the peculiar character of each, and until that is known, the relative cost of construction can not be determined. Upon one line the expenditure in connection with the freight traffic may be very light, while the outlay required by the passenger busi-

ness may be very great. Upon a neighboring line these peculiarities will perhaps be reversed.

Generally, it may be said that the nature of a country's products, coupled with the number and character of its inhabitants, fixes the status of the property built to accommodate it. This is so in all countries. "A densely populated district, occupied by a manufacturing or a mining population, has far different wants from an agricultural population; and the mountain districts of Scotland, or the sparsely inhabited portions of Ireland could be supplied with railway communication suited to their wants, by means of a very different mode of construction from that necessary for South Staffordshire or the metropolis."* When, however, a line is constructed wholly with a view to the accommodation of a through business,† the local wants of the district through which it passes receive, of course, little or no consideration at the hands of its proprietors.

When all the varied elements of business are manifest in the traffic of a company, it is at once discernable to an observer in the arrangement of its station facilities, in the miscellaneous character of the cars it employs, and in the adaptability which its locomotives possess for hauling different loads. The locomotive, it may be remarked, parenthetically, in connection with this reference

*Royal Commission on Railways, Report, p. xliii.

†As in the case of the Canada Southern Railway.

to it, is peculiarly subject, in its construction and cost, to the uses for which it is designed in particular cases, and its expense, relatively, to its owner, is directly dependent upon its adaptability to the immediate work in hand. If the load to be hauled is a light one, light machines will be employed, not only because they cost less originally, but because they consume less fuel and lubricants, are less destructive to the track, and the expense of keeping them in order is not so great. If, on the contrary, the load is heavy, the locomotive will be correspondingly heavy, for the purpose not only of economizing as much as possible in the number of machines, but for the purpose of reducing the number of trains and the numerous attendant expenses incident thereto.

A glance at the property of a railway company is sufficient to enable us to distinguish the prosperous and heavily worked line, from the line possessing only a light traffic. It appears, first, in the nature of the construction work, and, afterward, in the relative condition of the property. The prosperous enterprise will be well-kept and plump, the other lean and haggard; the one will be vigorous and animated, the other feeble and lacking in purpose; the road-bed of the former will be of generous proportions and durable character, the rails will be heavy and well preserved, the cross-ties broad and placed well together, the bridges admirably proportioned and of

durable material, the culverts constructed of stone and sufficient for every contingency of tempest and flood, the buildings large and well arranged, the equipment extensive and well adapted for work, and all the other accommodations required to do business corresponding to these in character.

On the poorly worked line, on the other hand, we shall find a pinched and contracted road-bed, more or less overgrown with weeds and grass, a cheap article of rail, worn and battered by time and hard usage, ties far apart and narrow of surface, buildings small, cheaply constructed, and of mean appearance, fences old and covered with patches, bridges gossamer-like in their construction, consumptive looking culverts, engines and cars light in weight and scant in number, and other facilities correspondingly limited and inexpensive. All these things we shall find upon an unproductive or poorly worked line.

When an unproductive enterprise does not present these peculiar characteristics, it is in those isolated cases where the property, and not the traffic it is designed to accommodate, has been considered by the managers.

Many short roads are constructed from year to year to accommodate purely local or neighborhood purposes. These lines constitute a class by themselves, and have little in common with the railroad system, properly speaking. They are constructed as cheaply as possible, their wants are

few, and their accommodations limited and of the rudest possible kind. They should, however, be built of durable material, and constructed according to the most approved plans by men actively versed in such matters. But it more frequently occurs that enterprises of this character fall into the hands of inexperienced (and therefore incompetent) men. When such is the case, the work is correspondingly poor, and the supplies and machinery used in construction not such as men of better experience would have selected.

The opportunities, more or less marked all over the world, for making money in connection with the building of railroads, has suggested the construction of many lines that, except for such opportunities, would never have been thought of, or, if thought of, would have been delayed many years. The railroad interest generally has in the past been much harassed by enterprises of this character, and very great hardships have, without doubt, been suffered by individuals, and communities as well, in consequence of them. They have, in many cases, served to destroy, either temporarily or permanently, existing values, without creating new values to take their place. The result has been temporary activity and *quasi* prosperity, followed by lengthened periods of depression.

When a road is built for the purpose of enabling its projectors to make money out of its con-

struction, the wants of the traffic it is to accommodate are not so likely to be inquired into with care as in those cases where the future owners of the enterprise actively superintend its affairs. The temporary interest which the parties having the improvement in charge feel in its future is very likely to lead them to do many things that they would not do under different circumstances. The securities of the company, for instance, will, it is quite likely, be placed in the hands of agents and brokers, for sale to the public, at figures that would destroy the credit of the enterprise if they were known or suspected by the community. Inferior material will be employed in many cases without profit to the parties interested, and the work will be slighted wherever it can be done without fear of immediate discovery. Where influences of this kind animate an enterprise it is compelled to pay more for its supplies than the nature of the articles purchased justifies, and the equipment put upon the line will be super-abundant in quantity, and deficient in quality, the amount paid for it being higher than the market price for similar articles. The full extent of the waste and profligacy of the managers of an enterprise thus inaugurated, however, is never apparent until after the property is completed and the cost of operating it is compared, year by year, with its gross receipts, and the expense of working neigh-

boring lines.* It is then too late to remedy its defects or secure redress for its owners.

The intelligence and experience of the management of a company is clearly evinced in the property it acquires. Generally speaking, its acquisitions in this line are of a character to meet the interests and approval of the stockholders. It, however, sometimes falls out that the property acquired is not such as is best adapted to its use, lacking in adaptability, or being of poor quality, or excessive in quantity; when this is the case the fault does not necessarily imply any purpose upon the part of the management inimical to the property, on the contrary the trouble is more likely to lie in its ignorance and incapacity. I have in my mind an instance of this kind where a company, and an unusually well managed company it was, purchased at different times three separate and distinct sites for the same building, without, however, erecting the building on either of the places provided. The site was in each instance purchased under a misapprehension of the company's wants. Events that might have been anticipated followed, in each case immediately after the transaction, demonstrating the want of fitness of the property for the purpose for which it was bought. The loss to the company interested, if loss accrued from the purchases, could

*This is true, for the reason that the cost of maintaining a property is always directly dependent upon the skill and adequacy, and the permanency that characterizes its construction in the first instance.

not be chargeable to any dishonest purpose of the management, for it had no such purpose, but rather to its impetuosity and lack of judgment and foresight.

In this case the company was too precipitate in anticipating its future wants. Errors of this kind, however, are of rare occurrence. It more frequently happens in our observation that too much caution is exercised by the managers of railroads in anticipating their wants, the opportunities of the enterprise being allowed to outstrip its capabilities before concerted effort is made to remedy its deficiencies. When such a state of affairs exists it is extremely difficult to locate the responsibility; it is quite likely, however, that the owners, and not the immediate managers, are responsible, the parsimony of the former, in many cases, and their ignorance of the wants of the property in others, leading them to place such limitations and restrictions on the management as to seriously lessen the usefulness of the property and greatly restrict its profits.

Such a state of affairs in the history of a company is sometimes, though rarely, brought about in consequence of the limited fortunes of the owners, it more often occurs, however, in consequence of the restricted credit of the company itself, and the neglect in which it is held by its owners.

But leaving out of consideration all these ex-

ceptional and comparatively rare cases, the amount of a company's outlay for purposes of constructing and equipping its property is governed, so far as the same comes within the knowledge or control of its *bona fide* owners or responsible managers, by the character and extent of its business and its profitableness to the carrier. And when, from any cause, its equipment or other property is found to be in excess of its needs, such disposition is made of the surplus as is most advantageous to the enterprise.

CHAPTER V.

Cost of Construction: A Common but Erroneous Impression in Reference to it — Newspaper Statistics and Conclusions — Our So-called Watered Stocks — Effect of Newspaper Deductions upon the Minds of Uninformed People — The Full Cost of Railways not Shown upon the Books of the Companies — Some of the Reasons Why — Failure of the Owners to Capitalize the Expenditures when made — Construction Disbursements sometimes Charged against Revenue — The ultimate Consequences of such a Course — The Construction Account sometimes Affected by the Influence of Bondholders and Preferred Shareholders — Railroads Opened for Business before being fully Completed — Some of the Reasons Why — Lack of Capital, Desire to Commence Business, etc.— The Custom Abroad — Defective Construction must be Remedied at a Subsequent Period — The Capital for such Expenditures Frequently Borrowed from the Revenue and never fully Returned — Difficulties in the way of Accounting for Construction Expenditures — The Conservatism of Railway Owners and Managers.

A large number of otherwise intelligent people believe, or profess to believe, that a railroad is to all intents and purposes fully completed on the day of its inauguration. And from time to time we are treated by newspaper writers and others, inimical to the railway companies, with elaborate tables exhibiting what they are pleased to term

the fictitious or watered values represented by the bonds and shares of such companies.

In these statements, curiously enough, every dollar added to the cost of a property after it is opened for business is represented to be mythical in its character and base in its purpose. They represent these values as existing only in the imagination of the proprietors, and having their origin in the desire of such proprietors to extract from the community dividends on capital never invested by them. It is apparent that the people who make statements of this character do so, in the generality of cases, maliciously and recklessly, without examining the returns of the companies or otherwise caring to ascertain what basis, if any, there is for their charges.

The effect of their statements is to create an impression in the minds of the ignorant (for whom the articles are written) that the traffic rates of railroad companies are much higher than is necessary to render a reasonable return to the owners on the capital actually invested by them, and, consequently, that such rates are unjustifiable and exorbitant to the extent that they represent such fictitious values.

A basis of reason is given for these charges in some instances in consequence of the omission of the railway companies to insist, in their accounts, upon the vital distinction that exists between construction and operating expenditures at the time

these expenditures occur. Any neglect of the owners of railroads or their representatives to capitalize construction expenditures when made or otherwise definitely and finally locate them in their records and returns at the time they occur renders the public disposed to question the trustworthiness of any claim that the companies may put forward for indemnification at a subsequent period of their history. In other words, when the railway companies are ready to capitalize investments of this description the community have ceased to remember the benefits such investments conferred upon it, and it is consequently, in many cases, loth to acknowledge their justness.

For the misapprehension of the public in reference to the cost of railroads, except in so far as it has been created by the efforts of demagogues, the railroad companies are themselves responsible. This responsibility or action of the railroad companies, it must be remembered, does not, however, presuppose any intentional wrong by them to any one; nor has any wrong followed it, except to the owners of the property interested. In this connection it is well to remember that exigencies that occur in the life of a great property (dependent upon so many varying circumstances and events as does that of a railway) must be handled in a simple and practical way that business men and investors can readily understand, and no manager can disregard this necessity without

losing his place. Hence the practices of the railroad companies in reference to the disposition of the cost of their properties in their accounts. It is only in exceptional instances that a company has felt entirely free to take cognizance, at the time and in the sense that it should, of the importance to it of making at all times and under all circumstances full, clear and accurate exhibits of the total cost of its property.

On the contrary, railway companies have, in many instances, sought temporarily, at least, to include a part of the cost of construction under other headings, notably those relating to the expense of operating: If an enterprise was unproductive or in discredit for the moment, its owners were compelled in many cases to bolster its falling fortunes by using its net receipts to add to its property account without providing for the capitalization of the amount thus invested.

Such a policy, a policy of treating disbursements for purposes of construction as ordinary operating expenses can have but one termination. If a property thus unavoidably discredited in its current history by its owners and managers should ever be able at a subsequent period to earn a return on its full cost it would, in the majority of cases at least, be debarred practically from doing so for the reason that its full cost would not be known, as its bonds and stock would only represent a part of its cost, and the law, or in lieu there-

of public opinion, would place a limit on the amount of dividends that it should declare on its capital.

However, the cases where a railroad company is compelled to deliberately and systematically seek to discredit its future enterprise or profitableness, by hiding or suppressing the additions made to its property at any period in its history, are not, it is believed, of general occurrence.

Still, the full cost of a property rarely, if ever, appears on the books and in the returns under the head of construction. The reasons are obvious enough to those familiar with the accounts and finances of railroad companies. The cause is not so much a neglect, in the majority of cases, as an omission, and may be said to occur without the knowledge of the owners.

The circumstances of a practical nature attending the financial affairs and accounts of a railway in course of construction are peculiar, and can not be accurately classified or described. In many cases the accountant can not distinguish in the disbursements between that which comes under the head of construction, and that which comes under the head of operation. Many trifling expenditures that will ultimately possess great value, pass upon the books of a company for merely nominal sums. Other amounts, again, that represent large sums expended, will, with the lapse of time and change of circumstances, greatly shrink in worth,

or cease entirely to represent any thing of value. Some of the practical characteristics of a railway company's financial affairs, while the property is in process of construction, are very graphically described by the railroad commissioner of Wisconsin; he says: "The elements of cost often include exchanges of value under every possible form, and under all conceivable circumstances, with no record preserved, except of the nominal sums paid and received. In original railway construction, bonds and stock are exchanged indifferently for labor or property; sometimes sold for money, hypothecated for loans, donated for contingent purposes, divided as interest on investment, or sacrificed wholly on sale and foreclosure. Oftentimes the record is itself wanting, and even nominal amounts of investment become the subject of speculative estimate."*

The incompleteness of our returns of the cost of railway property is also largely attributable to the rude and incomplete system of accounting affected by our railway companies, because of its simplicity and cheapness.

Under this system, the same, practically, all over the United States, no account whatever is taken of the innumerable petty additions to a property that occur every moment of its existence. Only items of considerable magnitude, such as the construction of buildings, sidings, and new rolling

* *Wisconsin R. R. Com.'s Report*, 1874, p. 19.

stock, are thought worthy of being embraced in the construction account and in the books of record incident to it. The regulations of all of our railroad companies on this point are substantially the same. In some cases these regulations are defined in printed instructions. In others, again, they are only verbally known. Upon many lines this policy of charging only considerable sums to construction has become traditional. Many illustrations of the practices in this respect might be cited, if necessary. One is sufficient. The Atchison and Topeka company, representing a great and growing property, in referring to petty expenditures for purposes of construction, explains to its employes that it is the general intention of the company, "That only important and permanent additions, materially increasing the value of the property, are to be charged to construction." The only difference between the instructions of the Topeka company and those of other companies on this head, if difference there be, is that the regulations of the former are perhaps better and more clearly defined than those of the latter.

The poverty and unproductiveness of our railroad enterprises first suggested the idea of omitting a portion of the cost of the property from the capital account.

When a company was very poor, or not able to earn a return on the business it handled, it was not esteemed important by accounting officers and

others, that the returns should exhibit fully and precisely the construction expenditures separately from the cost of working. Many of these officers, drawn from other pursuits in life, had, besides, only crude ideas of the nice distinctions existing between permanent and incidental disbursements, and the result of this ignorance is apparent in the accounts they compiled. Another reason for the omission is to be found in the expense an adequate system of accounting entails. The labor of separating the permanent from the incidental expenditures, although not relatively great, is so considerable, nevertheless, as to deter all not acquainted with the importance of the subject from attempting it.

Still another influence has operated to conceal the real cost of railroads. It is this: Where an enterprise is controlled by its bond-holders, or by preferred holders of any kind, the temptation of such persons is strong to use the net income of the property to improve and enlarge it, without capitalizing the amount so used, or otherwise allowing the holders of deferred securities any credit whatsoever. The amounts so used are included in the accounts as ordinary working expenses. This policy is, of course, pursued only where there is a balance left after satisfying the annual charge on the securities owned by those in charge of the property, and through which they are able to control it.

In view of these and other influences quite as important, some of which we have discussed elsewhere, we can understand how it has come about that much of the cost of our railroads is embodied in the returns under other headings. And in so far as this is the case, we can not be surprised that the public are indisposed to allow the proprietors credit for much that they have really expended, but of which they are unable to furnish detailed exhibits.

All of our roads, without an important exception, have been opened for business before being fully completed. The moment that the track of a company permitted the passage of trains at nominal rates of speed, flaming advertisements have heralded its completion, and these were followed by the throwing open of its temporary, or half completed warehouses and passenger depots, for business.

Many influences, some of which we can not now appreciate, contributed to bring about such a result, but the principal one has been lack of capital. This lack has caused the premature development of many enterprises that, except for it, would have remained in the hands of the contractors and builders until properly completed. It has caused the acceptance by the engineer in charge, of works in every stage of progress save the final stage that marks their completion. It has caused him to accept grades so abrupt and

long continued as to render the property practically worthless to the owners and to the public; to accept tracks laid upon the undisturbed earth, or upon elevations that a ground-hog might have raised; to accept ditches, the width, slope, and depth of which, were inadequate to the needs of the situation, and involving in their care continued expense to keep them open. And, finally, to accept embankments so circumscribed and narrowly constructed as to be barely sufficient to preserve the equilibrium of trains.

On lines thus built, the excavations and cuts through the mountains and hills were barely sufficient in width to admit the passage of trains; tracks were barren of ballast,* pasteboard bridges and light, wooden culverts were the rule, frightful chasms were airily spanned by giraffe–like trestle work that trembled and swayed with the weight of each succeeding train; upon such lines permanent buildings were unknown, and abandoned cars and rudely constructed sheds were thankfully utilized as offices and warehouses. On lines thus imperfectly built no systematic and effective effort was made to clear the right of way from trees, bush and grass, and where the line ran through the forest gigantic trees drooped their

*Where the ballasting of a line is neglected at the time of its construction the omission, except upon lines where the traffic is very light, can not but result in subsequent injury to the rails from the pounding of the machinery, either by breaking or bending them. The great distance, however, that many lines are compelled to haul the ballast they require renders it cheaper to put up with a common earth road than to attempt to provide the material necessary to properly ballast it.

branches over the track, and the undergrowth that grew beside it in luxuriant wildness beat like an Æolian harp against the ironwork and sides of the passing cars.* Sidings were unfrequent and inadequate in length, and on the roads we are describing the rolling stock was deficient in quality as well as in quantity; depot grounds were left undisturbed as they came from the hands of nature, tracks, light in weight and of poor material, were laid upon soft, watery and unstable ties, and much of the iron employed was already worn and battered with hard usage upon more opulent lines.

Such were the circumstances attending the opening of all of the roads now constituting our great trunk lines. In other countries greater formality is exercised, and defects of construction are required to be corrected before the property can be opened to the public.†

The cost of a railroad up to the time of its inauguration is merely preparatory when constructed

*The engineers of twenty years ago laid it down, as a rule, that where a line penetrated a forest all trees within a hundred feet of the track should be cut down. The effect of this rule would, of course, be to make the right of way 200 feet wide instead of 100 feet; but, like the rule laid down by them requiring a broad margin of several feet between the track and the slope upon all embankments, it was never, in a single instance, that I am aware of, faithfully observed. It was impracticable. The finances of the companies did not permit it.

†Thus in Great Britain no "railway can be opened for the public conveyance of passengers until one month's notice of the intended opening shall have been given to the Board of Trade; and if, in the opinion of their inspector, the opening would be attended with danger to the public the Board may postpone the opening for one month. . . . The Board may go on postponing the opening from month to month until their inspector's requirements have been complied with." *Royal Com'n. on Rys., Report p. xxviii.*

in the manner we have described; the great cost of rendering it able to sustain itself or accommodate a considerable traffic remains to be provided for afterwards, and the ability to correct these defects at a subsequent period, it should be said, is practically impossible in many cases without altering the whole character of the property and increasing enormously its cost.

No greater misapprehension exists in the public mind upon any subject connected with railroads than that in reference to the time when a property is completed, and the effect of this misapprehension upon the railway companies is likely to be so serious in the future that no effort can be too great, no matter by whom put forth, that will serve to correct it or lessen its effect. While a road may be said never to be fully completed, the community, nevertheless, as we have already explained, look upon every enterprise upon which trains are moving as being finished. Nothing, however, could be further from the truth, and any restrictions based upon such premises can not but be unfortunate in their effect upon both the railroad companies and the community. In a memorial to the Wisconsin legislature, written by Presidents Alexander Mitchell, and Albert Keep, referring to the misapprehension of the public upon this subject, they say: *

"When a road is graded, laid with iron and

*P. 21, 1875.

declared open for business, the popular impression is that the work is finished, whereas it is only fairly begun. Considerable ballasting and surfacing are required, and a great many warehouses, elevators and station buildings must be provided, together with a large amount of rolling stock and numerous other facilities before much business can safely be done. Cuts have to be widened, sidings put in, bridges and culverts strengthened, fences built, renewals made, and many other improvements made which add to the cost of construction."

All of the defects and omissions which characterize a railroad when it is accepted from the contractors or opened for business, must be made good, substantially, at some subsequent period of its history. In many cases the credit of a company is such that it can not at the time procure the funds required to make these improvements and additions. Its only resource, therefore, for many years perhaps, is its own earnings, and as the work of completing the property proceeds a considerable portion of the cost is directly or indirectly charged upon the books under one of the many items that are annually absorbed by the profit and loss account. In this way the cost of a property appears as an expense incident to its working, instead of forming in the returns, as it should, a part of the permanent capital account.

The immediate incentive for keeping an accu-

rate division of the construction and incidental expenditures of railroads is lacking in many cases.

A company that is unable to pay the interest on its bonded debt or earn a dividend for its stockholders, and with nothing definite or encouraging perhaps, in its future, will be quite likely to discountenance any attempt of its managers to add to its burdens for the purpose of employing clerks to keep its construction accounts separately from its working accounts. Before we consent to expend capital for such a purpose we require to be assured that it is necessary, and above all, that it will accomplish a purpose that will surely be beneficial to us at some future time, if not at the present moment. Without such assurance we refuse our consent.

The cautious owner or manager of a poor railway says, why make further charges upon our books to construction account when the company is manifestly unable to pay dividends on the amount already charged? Why subject ourselves to criticism and misrepresentation by further increasing our property account so long as we are unable to capitalize the present cost of the enterprise? Arguments such as these, of course, overlook or ignore the fact that a time will come, in the majority of cases, when the property will be able to pay a return on its total cost, but if no account is kept of such cost, as it accrues, the owners can never hope to be permitted, without

protest, at least, to exact a return for it from the community.

There are few, if any, railroads in this country, at least, that have earned a fair return on what they cost. They may have earned a fair return on the amount of their outstanding capital, but the amount of such capital does not, I think, represent, except in a few isolated instances, the full amount of money invested in the property, and it is doubtful at this late day whether they will ever be permitted, in the majority of cases at least, to issue shares or evidence of debt of any kind for the full amount of this unrepresented capital.

The permanent investment account of a railroad is, of all accounts, the most perplexing to the accountant. Only those familiar with such matters know how difficult it is after a road is once in operation to separate the expenditures for construction from the disbursements on account of operating expenses.

To secure trustworthy returns of the construction work of a road requires great circumstantiality and accuracy in keeping the accounts, and this accuracy can not be expected, except in a proximate sense, for the reason that a large number of the people, whose duty it is to furnish the data from which the books are written, possess no knowledge whatever of accounts, and no facility or aptitude for acquiring such knowledge.

In constructing a property many things enter as an element of cost beside the labor expended directly upon the work, and the first cost of the material used in connection with it. Thus, in replacing a temporary with a permanent structure, we must ascertain what would be a reasonable charge for the use of tools, for the value of the implements lost and damaged, for the cost of transportation of the material and men employed in the work, and finally, for the expense of superintendence. All these things must be ascertained, in addition to the amount of the wages of the men directly engaged upon the work and the cost of the supplies used. In many cases engines and cars must be employed in handling the material or removing the obstacles that may be in the way, and in such cases allowance must be made for the equipment and men thus engaged. When the work has finally been completed the original or first cost of the structure replaced must be deducted before the account can be closed.

Many of the items that we have enumerated as properly entering into the cost of construction can only be approximated. This approximation requires, in most instances, exhaustive research and a manipulation of the returns, at once tiresome, expensive and in many respects unsatisfactory when completed.

The cost of keeping an accurate account of the permanent expenditures of a railroad are a severe

tax upon a wealthy company; if the company is a poor one, and most of our roads may be classed under that head, the expense would become, in many instances at least, a positive burden. And herein lies the explanation of the neglect of our companies to keep separate accounts, except of the more costly improvements made by them, and in connection with even these accounts we notice lack of accuracy in many important particulars, such items as charges for transportation of men and materials, use of tools, compensation for use of engines and cars employed in the immediate neighborhood of permanent works, and the cost of superintendence being wholly or partially omitted very frequently in ascertaining the cost.

Still other reasons than those we have given might be cited, if necessary, in explanation of the inability of our railroad companies to exhibit the full cost of their property. We will content ourselves, however, with giving one.

Those familiar with the owners and responsible managers of our railways know them to be men of extreme conservatism. Like men of capital in other pursuits of life they are intent upon building up and strengthening their investment. Like the farmer who digs a ditch or builds a fence, they know that every dollar judiciously expended upon their property enhances its value. The instinct of caution inherent in them, and to which they owe what they have, is continually urging

them to make these expenditures from the net earnings of the property when it can be done without impairing the marketable value of its stocks. In this way they add to the security upon which their investment rests, and thus increase the chances of its permanency. The wisdom of such a policy could not be questioned, if the business of the property were never likely to increase so as to earn a return upon the whole amount invested in it, but as the business is likely to so increase, and has in many cases already so increased, the short sightedness of their course is at once apparent.

There are instances, doubtless, where the owners of railways do not possess the conservative characteristics noticeable in the class just referred to. There are reckless owners and managers of railways, just as there are reckless bankers, manufacturers and merchants, men so eaten up with the desire of immediate realization that they can not await the slow processes of time. But this class constitutes, at best, only a feeble minority. The effect of their action, however, although unimportant in its influences on the railway interests as a whole, has tended to weaken the confidence of the public at large in the conservatism of the owners of railway companies as a class. This is unfortunate for the latter, as a class of people whom the public are accustomed to look to for instruction, have taken advantage of the circum-

stance to traduce the railway companies. This class seem determined that the distrust of the railway companies, born of misapprehension, and having at best, only a modicum of reason for its existence, should not die out; on the contrary, they strive assiduously to keep it alive, and in the accomplishment of this purpose they do not hesitate to misrepresent the action of the owners and managers of our railroads and the policies by which they are governed.

On their side, the railway companies, it is noticeable, are disposed to treat their traducers with great consideration and tenderness. It is their policy to temporize, and to this policy I ascribe much of the abuse and misrepresentation that is showered upon them. As a rule they are much too deferential in their treatment of the infinitesimal demagogues who harass them, much too willing to acquiesce in acts of downright injustice not sanctioned or known by the public. Their cowardice or timidity (whichever it may be called) in this respect, is so marked that it invites attack, and much of the loss and annoyance that our companies are subjected to from year to year is owing to that fact. It invites the active and malignant interference of the very enemies it is designed to placate.

CHAPTER VI.

Labor — Proportion that Operating Labor is of the Gross Cost of Operating — Proportion that it is of the Aggregate Revenue — The Workings of the Railway System Governed by the Law of Supply and Demand — The Influences that Affect Railway Interests Affect the Community Correspondingly — The Collection and Disbursement of the Revenue of a Railway Company Co-incident — Railway Interests can not be Injured without a Corresponding Depression in every other Field of Industry — Necessity for the Equilibrium of Trade — The Natural Laws Governing it — Railway Property, to Reach its Maximum of Usefulness to the People, must be left Untrammelled — Injurious effects upon the Community of a feeling of Antagonism towards Railway Companies.

Leaving out of consideration the disbursements for labor on account of the construction work that progresses uninterruptedly with more or less activity upon every railway line, we find that the average outlay of a company for labor is in the neighborhood of sixty per cent. of the gross cost of operating, and about thirty-eight per cent. of the aggregate revenue. In other words thirty-eight per cent. of the total amount collected from the community for transportation services is at once returned to it in the shape of wages paid to railway operatives, of the remainder, twenty-six

per cent. is disbursed for taxes and supplies, a portion is paid out for interest, and the balance is available for dividends, save such portion as may be required to meet the necessary additions and improvements required by the property. These additions and improvements, it may be said, however, are sufficient, in many instances, to absorb any income there may be left after meeting operating expenses, taxes and the interest on the funded debt, leaving nothing whatever to the proprietor or shareholder. In other cases only a portion of the surplus is expended upon the property. However, whatever proportion is thus diverted it clearly belongs to the owner, and upon it he is entitled to interest as in the case of the original investment. The only right and proper way, therefore, to treat expenditures of this kind is to capitalize them. This capitalization may occur at any time subsequent to the outlay, whenever, in fact, the credit of the company interested will allow, or the interest of the property will permit. Only by such a course is it possible for the lender, who in this case is the shareholder, to be sure of a return upon his investment. Sometimes obstacles supervene to prevent the accomplishment of this purpose. In one of the great States of the West, for instance, a constitutional prohibition forbids railway companies increasing their share capital. If they enlarge or improve their properties the added values must be mortgaged if

they wish to reimburse themselves for the outlay, otherwise the expenditure is in the nature of capital invested for the benefit of the community at large, from which no return can be hoped by the lenders.*

The fact that the principal disbursements of a railway company in connection with its current operations are for labor is not generally known even to railway men. This is one of the minor surprises that attend a minute investigation of the subject. Other things equally remarkable, but of relatively greater importance, perhaps, to the community, will occur to us if we seek to develop the subject. We shall find, for instance, if we carefully examine the working of our railway system, that the law of political economy, the law of supply and demand, as explained by those who have studied the subject, apply to our railway companies with surprising accuracy; that the same influences, in fact, that operate in fixing the status and value of manufactured products apply equally to transportation, the manufactured product of railroads. That railway property is the first to feel any disturbance in the economy of life, whether it be in the value of real estate, the price of breadstuffs, the rate of wages, or the price put upon manufactured and other materials.

*It is claimed, I believe, however, by those experienced in such matters, that the obnoxious provision referred to, preventing the capitalization of investments, may be avoided by a railway company by the sale of its property to a new organization, which latter may capitalize its property for its full cost.

It will also appear that any thing that acts to the disadvantage of the railroad interest, whether produced by natural or artificial laws, will ultimately produce a corresponding depression in the community at large. Notwithstanding this fact it has long been apparent to intelligent observers that a very large class of our people look upon the railroad interest as something apart from the common industrial affairs of the community, and not a matter about which those interested in the latter need give themselves any concern. Nothing, however, could be more fallacious than such a view of the question, or more pernicious in its consequences to the general public.

The interests of the people, as a whole, are indissoluble, and any thing that operates to the detriment of one class, be it the owners of railways or the owners of farming lands, will eventually prove correspondingly injurious to all other classes. The source from which the injury emanates is immaterial. In the case of railroads it does not matter whether it arises from unwise legislation, the pressure of public opinion, unjust criticism, excessive competition between rival lines, or from unfit or extravagant management. The effect, direct and collateral, is substantially the same in either case, so far as it regards ultimately the material prosperity of the community at large.

A more just appreciation of these facts and a

higher observance of their requirements, it is apparent from a retrospective view of the past history of railroads in the United States, would have added greatly to the prosperity of both the railroad companies and the public.

The collection of the revenue of a railroad company and its disbursement may be said to be co-incident. Frequently, however, the revenue is anticipated, being expended or contracted for in advance of its occurrence. Under the most favorable circumstances the uncollected earnings of our railway companies equal, if they do not exceed, their current obligations. The receipts from merchants and others for transportation services do not, consequently, remain in the vaults of the railroad company, but pass back without sensible interlude into the possession of the persons from whom they were received. The proceeds of the check given by the grocer or hardware merchant for the carriage of his goods he receives back directly with its accretions through the medium of purchases made by the railway company and its servants, or, indirectly, through the trade of those who are dependent for their subsistence upon the interests that center in the property of railroad companies.

The remunerative revenue that is derived from the movement of grain and other products of the farm is largely disbursed, as we have already

explained, for improving the property, and in adding to its capacities, thereby enabling the proprietors to accommodate the agricultural classes with greater expedition and at lower rates than would otherwise be possible.

The history of our railway companies abundantly demonstrates this.

Thus the railway companies and the different classes of society are blended in a common purpose, a purpose having for its object the advancement of the interests of each other, and in the accomplishment of this great and beneficent purpose each element contributes, though selfishly, perhaps, what it is able to the betterment of the other.

It is apparent that no interest so considerable as that of the railway companies can be stricken down without a corresponding depression being felt in every field of industry. The prosperity of the laborer, merchant, landowner, farmer, or newspaper proprietor is only of temporary duration if the interests centering in our transportation companies are unremunerative.*

*Mr. William H. Vanderbilt (who has, without doubt, as great a personal interest in the continued prosperity of the country as any other citizen of the Union), having occasion to refer, incidentally, to this phase of the subject in a communication to the press in June, 1878, says, with great pertinency, "Every bankrupt line tends to drag others down; such a road pays nothing to stockholders or bondholders; it has no responsibility to owners, patrons or the public. * * * If all the great trunk lines were brought to that condition, not only would immense properties be destroyed but credit and trade be so paralyzed that every interest and the whole country would be irreparably injured." What Mr. Vanderbilt says of the great trunk lines applies with equal force to the rail-

The exactions of capital, wherever placed, are fixed and determinate and in happy accord. Without its confidence and support industries languish and die. Enterprises widely separated, or seemingly having no connection whatever, wait patiently upon each other's prosperity. An attack upon one recoils directly upon the other. We see that everywhere the bond of sympathy is complete, and that the equlibrium of trade is as essential to the fruition of generous enterprises in business as the equal and exact distribution of the forces of nature are necessary to their harmonious action. Any thing, therefore, that jeopardizes the credit of our railroad companies or restricts them in the exercise of the privileges necessary to their successful operation, is unwise, and will eventually re-act upon the public that countenances or encourages such practices.

It is also apparent that the interests centering in our railways can not, with safety, be made subservient to the selfish purposes of others, as a large class of our people seem to suppose, nor can the methods by which the roads are operated be changed, no matter how specious the argument or ingenious the theory, without the introduction of forces that can not but prove detrimental. Our observation is uniform in this, that when a community attempts to make any great interest, such as that centered in our railroads, subordi-

road interest generally, or to particular portions of it, without reference to location.

nate to some personal or purely local purpose, such attempt is destructive to the prosperity of the people who precipitate it; and the disastrous results that follow their efforts are not measured, as we might hastily suppose, by the temporary success they meet with; on the contrary, their efforts may fail, as they often do, of accomplishing the object sought. Nevertheless, they have the effect to destroy or cripple the prosperity of the community through the distrust they engender everywhere in the minds of business men and capitalists, upon whom such industries are depen dent.

Railway property, like all other classes of property, founded upon the wants of the community, must be left untrammelled, otherwise it can not reach its maximum of usefulness. No substantial or permanent good to the people will ever be accomplished by the unsolicited interference of the government in its affairs, or through the introduction of extraneous influences in its daily operations. When its interests, and indirectly the interests of the community, can be benefited by the active interference of the government in its affairs, we may confidently believe that those who own our railroads will eagerly invoke such aid. Until that time arrives active interference is inopportune.

Like every other business enterprise that, by its beneficent influence merits our esteem, the

control and direction of our railroads must be left to those general laws that govern the commerce of the community amidst which they are placed, if we wish to reap the greatest good of which they are capable. The forces that operate in the formation and control of these influences are based on the general intelligence of mankind, and may be termed God's natural laws. All other laws are more or less restrictive in their operations, beside being transitory in their forces and accidental in their application.

The first element necessary to success in the affairs of trade is definiteness of knowledge as to the influences that are likely to operate to the advantage or disadvantage of the project in hand, whatever it may be, and until such influences can be ascertained and weighed the enterprise will languish for want of support.

These pertinent and well established truths being apparent we may estimate the injury that has been done to all classes of people, though without their knowing the cause in all cases perhaps, in consequence of the ill considered and unnecessary legislation (State and municipal) that our railway companies have suffered from; in consequence of the fostering of a belief in the public mind that railway property is more selfish in its exactions than other kinds of property, and that it is largely based upon fictitious (or watered) values; in consequence of the assertion, direct

and implied, that the interests of the railway companies and those of society are inimical, and finally, and in consequence of a belief, participated in by a large class of people, that the railway interest can be made subservient to selfish purposes of a nature foreign to its natural intention without detriment to the community or State that attempts it.

CHAPTER VII.

Labor — The Organization of the Working Force — Principles to be Kept in Mind by Managers — Simplification of the Work of the Many — Utilization of the Supervisory Force — The Duties of both Classes to be kept Distinct — Danger arising from Unwisely Economizing in the Supervisory Force — The Necessity of every Officer having a Substitute or Vice Agent capable of Performing the Duties of the Principal — Qualities Required in the Substitute — The Value of such a Substitute to a Company; it is a Connecting Link in the Management, rendering a Continuous Policy Possible — Some of the Evils to a Company arising from the Introduction of New and Inexperienced Officers — Difficulties in their Path — What they have to Learn.

The economical operation of railway property requires that in organizing the necessary force the management should keep in mind, first, the simplification of the duties of the greatest number of operatives, and second, to increase the usefulness and restrict the number as much as may be of those who perform merely constructive or supervisory work. In other words, the object should be to make the relative number of actual workers as large as possible, and the number of supervisors as small as possible. The former furnish the mechanical effort, the latter the directing impulse. Each is essential to an efficient organization, but

the two classes should not be confounded, nor should either be allowed to trench upon the domain occupied by the other; that is to say the high priced laborer should not be encouraged to busy himself with duties that can be performed as well or better by labor of a cheaper grade, and the low priced laborer should not be permitted to assume the discharge of functions that require qualities of an order superior to his. That this necessary and proper order of duty will be disregarded in many cases, is to be expected, but the servants of a company should never be encouraged by a superior officer to transgress its requirements. I was greatly impressed with the truthfulness of my conclusions on this subject, many years ago, by seeing the superintendent of a great railroad actually busy himself with shovel and pickax in the hurry and excitement of repairing a track washed away by rains, while great, brawny laborers stood idly by, looking on as he worked, commenting pleasantly meanwhile upon his breadth of shoulder, well set head, energy of purpose, etc. The superintendent was particularly esteemed by his employers, I was told, as an energetic man, and one especially fitted to command men.

While economy of management requires that the number of those who merely plan or direct the work of others should be restricted as much as practicable, there is a point where this policy

is, if unwisely exercised, likely to operate to the serious, if not permanent, disadvantage of the property.

That point is reached when a company fails, either through the ignorance or design of its officers, to make adequate provision for filling its various responsible offices while the incumbents of these offices are still in the full exercise of their duties.

Every officer, no matter what his rank or grade, should have a substitute somewhere in the service. Under all ordinary circumstances this substitute should fill the office of assistant to the man he is destined finally to succeed. This substitute or vice agent should be qualified to perform, as nearly as the circumstances of the case will permit, all the duties of the principal, and he should possess, in addition to this, elements of physical health that may perhaps be wanting in his associate. The substitute should be employed with a view to his future usefulness, quite as much as to his present worth. This will necessitate the possession by him of peculiar qualifications. In the first place he must, of necessity, be of tractable disposition and loyal withal to his associate or chief, as well as to the company employing him. He must also possess robust health and ability sufficient to fill the office.

A mean desire, born of incapacity and cowardice or treachery may, and does, it is feared, in some

cases, lead to the installation of assistants, persons lacking these necessary qualifications, it being the evident desire to fit into the office automatons only, men of straw, small and weakly, with just enough vitality to crowd out or discourage the application of men of more respectable talent and brighter prospects. This disposition, it is needless to say, can not be too strenuously combatted by railway owners.*

The vice agent, or substitute of an officer or employe, should be a man every way fitted to assume the responsibilities and duties of the principal, when, for any reason, the office of the latter becomes vacant, either temporarily or permanently. Meanwhile he should, if an officer's assistant, be the confidant of his chief, the receptacle of his views in reference to the property and its policy, present and prospective.

A service organized with this understanding will, undoubtedly, cost temporarily a greater sum than a service organized without reference to the future care and policy of a company. The ultimate effect, however, of such wise provision can not but be favorable to the enterprise that practices it. While it may be necessary, in a measure, to base the

*I remember, some time back, having my attention called to a confirmed and almost helpless paralytic, who had, while in that condition, been appointed to the office of assistant to a railway officer of great prominence in the country. The office filled by the invalid was one requiring great energy, clearness of perception and considerable activity, besides continuity of service. The real office he filled, however, was that of the canny spook, in the nursery book, which the crafty old man kept to frighten inquisitive and naughty children off his preserves.

salary of the substitute, to a limited extent, on the duties of the office he is expected to hold quite as much as on the duties of the office he at present holds, still the knowledge he acquires of the property and of its future, and of the duties that will ultimately devolve upon him, will, when he succeeds to the office, be invaluable to the company employing him.

Under such an organization the policy of a company may be made far seeing in its scope and continuous in its application, whereas under any other form of organization it can not but be fragmentary in its purpose and temporary in its conclusions.

Those not familiar with the practical operation of railroads can hardly estimate the innumerable mishaps and unrecorded losses that occur to a property in consequence of the introduction into its life of new and inexperienced officers,* of officers unacquainted with the duties they are to perform, unacquainted with the manner in which those duties have been performed in the past, or the scope and circumstance that is expected to characterize them in the future. The result is always disastrous, no matter how great the ability or how upright the intention of the new official. Under the most favorable circumstances he is placed in

*And they never will be able to appreciate these mishaps and unrecorded losses, for the reason that it is the interest of the class who precipitate them to conceal the real facts in the case from the owners of the property.

the position of a man called upon to act without possessing the definite and trustworthy knowledge necessary to enable him to act intelligently. He has every thing to learn, from the arrangement of his files and office furniture, to the unrecorded policy that has governed his predecessor. He has to learn the local and foreign geography of the line, its peculiarities, traditions and prospects; what it possesses and what it does not possess; its contracts, agreements and leases; the officers and employes who operate it, and the people who give it support. All these things must be learned by rote before a new officer is either valuable or trustworthy. In the acquisition of this knowledge he is harassed by doubts, and his path is otherwise beset by obstacles. While slowly and laboriously acquiring such information in reference to the property, as is necessary to enable him to act intelligently, he must attentively study the peculiarities of his associates, must win their regards, must placate the unfriendly, disarm the suspicion of the jealously inclined, warm into active co-operation the indifferent, while he must at the same time ingratiate himself into the favor of the public, and acquire the hearty good will of those who patronize the property he represents. He must, in fact, so cement his fortunes with the interests and affairs of his new employer as to make the understanding of the two identical in feeling and regard, outwardly as well as privately.

All this requires months and years of patient study and methodical industry; a labor not to be described and that can not be estimated by those unfamiliar with the duties of a railway officer in their highest and best sense.

CHAPTER VIII.

Labor — Importance to a Railway Company that its Officers and Employes should remain uninterruptedly in its Service, and that their loyalty to its interests shall be full and complete — A Property can not hope to reach the Maximum of Prosperity if its Operatives are Indifferent to its Success — The Property the Football of the Employe — The Servants of Railway Companies make and unmake Values — The Importance of Promotion as a Factor in the Economy of Railway Operation — The Basis of Wages — The Multiplicity of Grades established by Priority of Service, Superior Attainment, and the Performance of Duties of a Higher Order — The Ambition of Railway Men — Their love of Distinction —The Attractiveness of Office — No Provision for Worn Out Operatives yet possible in this Country — Promotion a Substitute therefor.

In the workings of a railway corporation it is not only necessary to employ a large number of men but it is essential to the prosperity of the enterprise that all those who fill positions of responsibility, from the office of manager down to the place of section boss, should remain uninterruptedly in its service. Not only must the incumbents in the numerous offices of trust be retained without change in its service but it is essential to its vigor and healthful growth that their loyalty to its interests should approximate in earnestness and duration to that of the proprietor himself.

Without this integrity of purpose, this intensity of devotion, it is impossible that an enterprise should ever reach the highest point of productiveness of which it is capable, no matter how hopeful its prospects otherwise.

A property can not hope to reach its maximum of prosperity or produce the returns of which it is capable if any considerable number of its servants are indifferent to its success, or are controlled in their operations by purely selfish motives. Their lack of zeal in its behalf will result in the total or partial loss of its present resources, and will impair, if not destroy, its future prospects.

The company is the puppet of the servant, not qualifiedly, but absolutely, except where the property is unimportant in extent, and is worked under the immediate eye of the proprietor.

The agents of our companies make and unmake values. If discreet and faithful the property progresses under their guidance. If they are unfaithful or lacking in ability it shrinks in value and importance; this shrinkage goes on, oftentimes for a long period, to the surprise and amazement of the proprietors who see the effect, but are unable to discern the cause.

It is essential to a property that the honest fidelity of its employes should be assured, and by employe we wish to be understood as embracing every person in its service, without reference to his position or pay. This fact is better under-

stood now than formerly, being observable in the selection of the agent in charge, and especially noticeable in the considerate and kindly regard which our railway companies pay to him, no matter how high or how low the position he occupies.

The responsible management, whether consisting of one man or a dozen, is treated, we remark, by the proprietors of our railroads, with courteous consideration; and the management, as the immediate representative of the proprietors, endeavors in every reasonable and proper way, in its turn, to express the value that is put upon the services of those holding positions subordinate to it. Any thing of a nature likely to demoralize the force or cause the men of which it is composed, individually or collectively, to have a mean opinion of the office they hold is scrupulously avoided. Vacancies, as they occur in the force, are filled by the promotion of subordinate employes. These promotions carry with them increased pay, additional responsibilities and heightened consideration. This is illustrated in many ways: The firm hold that the practice of giving passes to railway men has upon our system of management, is based largely upon the fact of the beneficial influence it has, or is thought to have, upon the recipients of these favors; the effect indirectly being more beneficial, in fact, to the employer than an increase of the pay of the operative would

be. Except for this a railway company would, we think, scarcely consent to extend the free use of its line to the servants of other companies.

A thoughtful and experienced railway manager, we have observed, seeks in every way to foster a feeling of apprehension for the welfare of the property in the mind of its operatives. Without this participation of interest his individual efforts in its behalf are of little avail. He watches, therefore, in every way to encourage and cement in them feelings of regard for the interest which they represent in common, and in the pursuance of this object he eagerly seizes every opportunity to promote the interests of a deserving employe. By such a course he intensifies the ambition of his subordinates. A contrary course, it is manifest, would destroy this ambition, and in so far as it did so, would re-act disastrously upon the property interested. He also finds it proper and desirable, in many cases, to advance the wages of old and faithful subordinates, without assigning to them any new duties. This increase, unimportant in amount to the company, not only stimulates the recipient but heightens the interest of those about him. In ways such as these a discreet and thoughtful manager attaches the employe to the property and builds up within him an individual interest and hope in its success not attainable in any other less practical way.

We have said that the length of time that an

employe has served, and the fidelity that has characterized his service influences his pay quite as much as the quality or quantity of the work he performs. This is true. The veteran conductor of a through train, for instance, expects, and as a rule receives, higher wages than his junior in the service, who perhaps has charge of a train occupied with local affairs only. The latter accepts the justness of the claim of his elder brother to superior consideration without a murmur, although the work of the junior is in every respect, perhaps, more arduous than that of his senior. He recognizes the fact that the preference shown to the old employe is the regard paid to established merit. We find a like distinction manifest in a more or less marked degree wherever two or more men are associated together in connection with any particular class of work. The distinction may not find expression in the wages paid, but it exists nevertheless, and is well understood by the management as well as by those more immediately interested.

In this way innumerable grades are established in the service, each grade having the permanency and definiteness of an established rule. These grades, the result of priority of service, superior attainment, or the performance of duties of a higher order, satisfy measurably the cravings of the employe for advancement. At the same time they serve to stimulate his ambition to the utmost.

He sees stretching before him in illimitable perspective, a succession of steps, each succeeding step being higher than its fellow. His life is occupied in climbing this ladder, the topmost round of which no one has ever yet fairly grasped, because its attainment embraces the control of the whole railway system and its complete elucidation.

The honorable distinction that the different offices in the gift of a railway company confer upon those who occupy them is each year becoming more clearly defined in the annals of railway life. These distinctions, little understood by the public at large, cast a roseate glow over railway service. They give it eclat, they surround it with a glamor that serves to rob it, in a measure, of the base mechanical and common attributes that would otherwise envelop it. To railway men of even ordinary attainments the acquisition of money does not, as a rule, have the attraction that an office they have not yet reached possesses for them. The hope of attaining the consideration this office affords, or is thought to afford, incites them to renewed efforts, and thus is warmed into vigorous life talents that would otherwise lie dormant.

It is manifestly, therefore, the interest of every company to surround the various offices in its gift with such show of consideration, such glamor of expectancy and desire as is consistent with the

simple and economical discharge of business. In this way, and only in this way, can our companies build up in their organizations an integrity of purpose and high personal resolve, sufficient to foster and protect their interests; money in itself will never bring about such a result.

Up to this time the poverty of our companies has prevented their making any fixed provision for worn-out employes. The effect of this, undoubtedly has been to lessen somewhat, whether justly or not, the attachment of the servant. But an omission such as this is felt perhaps less in this country than it would be in any other, for the reason that we attach a sentimental regard to our personal independence and self sustaining power, not experienced by any other people in the world. The inability of our companies to make any provision for those who have broken down in their employ is in a great measure neutralized through the personal enthusiasm or ambition of the men. The superstition connected with the service that clothes every officer and superior grade with undefined powers and privileges, and the reasonable prospect held out that such powers and privileges may one day be exercised by the humblest employe leads the operative to forget, for the time being at least, matters that he will at a later period of life esteem of far greater importance.

CHAPTER IX.

Relative Expenses of Railroads — The Variableness of the Cost of Operating different Roads and of Operating the same Road at different times — Some of the Influences that Affect such Cost.

We come now to the subject of the expenses incident to the operations of railroads. And in this connection the first thing that strikes us is the variableness of these expenses. It is apparent at a glance that the cost of operating the property of railroads is never the same relatively upon any two lines, nor is it the same, except by chance, for any two years or other period of time upon any particular line.*

It will be remarked by the student in connection with the variableness that characterizes the expenditures for working our railroads that the same influences that contribute to swell the first

*Referring to this difference in the cost of working railroads as exhibited in the aggregate returns for the different companies in Michigan for 1877 the able Commissioner for that State, Mr. W. B. Williams, in his Report, page 17, says:

"The returns of the companies for the year 1877, show an increase of expenditure for maintenance and repairs of $478,646.54 over the preceding year. This expenditure, I suggested in the last annual report, would necessarily result from the fact that the great reduction in this class of expenditure for the previous years, and the impaired condition of the roads resulting therefrom, had rendered it necessary, with a due regard to safety and economy in the operation and management of the roads to enter upon a thorough system of renewals and repairs."

cost of a road, above the average, serve, in the majority of cases, to increase its operating expenses proportionately after the property is open for business.

In investigating the subject of railway economy each enterprise must be considered, and judged according to the local circumstances that surround it, and of which it is but the creature. In no other way can its status be accurately ascertained or defined.

The causes that produce the differences in the cost of operating a property are so numerous and so complex in their character that we can only hope to notice what seem to us to be the more important among them. A thorough analysis of their merits, and the causes that produce them, and the sequences they engender would require more space than could possibly be compressed within the limits of a work such as this. But a partial analysis and explanation is within our present ability and purpose, not, it may be said, so much for the information and instruction of railway experts as for the benefit of the great body of the rank and file in the service of railway companies, whose individual facilities for observation and experience in such matters are at best somewhat limited.

The influences that occasion the differences in the cost of working our railroads also cover incidentally many of the more important questions of

operating. They open up collaterally the whole subject of railway expenses.

Those that we would notice particularly, in addition to those that we have already explained in connection with the cost of railway property, etc., are:

The relative cost of supplies, of labor, the nature and climate of the country in which the property is situated, and the character of such property; the terminal charges incident to the conduct of business, its direction, weight, and the speed with which it is moved; the distance that the traffic is hauled, the amount of the fixed expenses, the condition of the property and its adequacy; the ability and fidelity of the officers and employes in charge of the property, and their acquaintance with its affairs; the extent of the property operated, the cost of transporting the operatives and supplies required, and finally, the taxes imposed.

Let us take up these conditions in their order, aud without attempting to give the subject the exhaustive explanation its importance, perhaps, merits, we will notice the more salient features of each.

CHAPTER X.

Relative Expenses of Railroads — Railway Supplies Considered — The Cost of Fuel and other Supplies — Things that affect such Cost — The Expense of Handling — The Distance from the Base of Supply — The Direction of the Current of Traffic — The Amount of Shrinkage — The Quality of the Supplies, and their Fitness for the Purpose for which they are to be Used — The Quantity a Company Purchases — The Credit of the Company making the Purchase — The Interest on the Money Invested — The Cost of Caring and Accounting for the Supplies — The Value of the Storage Room required — The Cost of Substituting New Material in place of Old and Worn-out Material — The Purchase of an Inferior Quality of Supplies — The Consequences to the Companies Interested — The Transitional Period in the History of Rails — The Resulting Expenses Occasioned by the Use of Poor Supplies — The Temptation to Buy Cheaply — The Cost of Substitution of Rails — The Paramount Importance of a Durable Track — The Duration of Iron Rails — Inferior Cross Ties — Worthlessness of Old Ties and the Disposition to be Made of the Same — Cost of Substitution of Ties — Inferior Bridges — Cost of Rebuilding and Substitution — Incidental Cost of Poor Bridges for Repairs — For Loss of Life and Property — For Loss of Revenue occasioned by Engendering of Distrust in the Minds of the Community, etc. — The Effect of Using Inferior Material on Buildings — Inferior Lubricants — Difference in Prices — Effect upon the Equipment and Machinery — Cost of Accidents Occasioned — Inferior Equipment Materials — Resulting Expense — The Cost

of Supplies sometimes Affected by the Accomplishment of Auxiliary Purposes — A Desire to Foster Local Manufacturers — To Open Up New Territory, etc.— The Interests of the Railroad Company and the Local Producer Identical.

In attempting to ascertain the cost of supplies, including fuel, we must not forget that to the first cost of an article there must be supplemented the expense of handling and also the cost of transporting it to the point where it is finally to be distributed for use. These items may be said to constitute the incidental cost. The actual cost of an article thus becomes dependent on the expense of handling it and the distance the distributing point is from the original base or place of purchase.

To illustrate, the first cost of fuel is very small to many of our companies, but upon many roads the expense of hauling it a long distance and the absence of economical facilities for unloading it from the cars into the storehouses, and afterwards placing it upon the locomotive tenders for immediate use, makes the actual cost of the article much greater than it is upon other lines, much greater even than is discernable from the accounts;* this expense is aggravated in the case of many companies by their having no return load for the cars occupied in transporting the fuel

*The difference between the cost of fuel upon lines located in sections where the price was relatively high has been ascertained to be 350 per cent. greater in important instances than in localities where the article was more abundant and more easily accessible.

they use. Upon the great bulk of our lines the current of traffic moves mainly in one direction, and when this current runs in the same direction that the supplies required in the operations of the property must be moved it results that the company interested has no return load for the equipment engaged in transporting such supplies, and thus an additional element of cost appears, but this additional cost is incidental only, and does not, therefore, appear in the returns, except under foreign headings; and because it does not directly and explicitly appear in the accounts its great importance to the railroad company is frequently unknown, or is disregarded by many otherwise close observers of such matters.

In describing the expenses of a railroad we can not, if we would, group in the accounts, or elsewhere, under one heading, all the expenses incident to a particular account or article of material consumed.

To the first cost of supplies we must add the cost of the shrinkage, and in the case of fuel and oils this shrinkage is very great, varying in amount from five to fifty per centum. The cost of substituting new material for old, when the former is used for purposes of repairs or renewals, must also be remembered. With many classes of material the cost of substitution equals or exceeds the first cost. It is considerable under the most favorable circumstances. The disbursements, for

instance, that attend the substitution of new track materials for old and worn-out material of the same character is very great; this is noticeably the case with the track rails and cross ties. It is the same with machinery and the fixtures that appertain to bridges, buildings and other structures. The cost of substitution in such case adds very greatly to the expense under the most favorable circumstances.

In attempting to ascertain the cost of any kind of material we must also consider its collateral effect. Thus, in weighing the value of a particular quality of fuel, a railway company must first ascertain its heating capacity and its effect upon its locomotives as well. The effect, therefore, upon the machinery, and not the price asked for the coal by the dealer, really determines the value of the article and its cost to the consumer.

To purchase an article without first ascertaining the ultimate expense, as determined by its direct or collateral effect, would be, in many cases, to occasion the company interested a loss proportionate only to the amount of the transaction.

The quantity of the material required and the ability to pay for the same affects very sensibly the price for which it can be bought.

The interest on the money invested in supplies forms also a part of their cost. The attention expended upon an article, and the accounting that it

involves should also be considered, neither should the cost of the storage room necessary for its accommodation, or the outlay it involves for insurance be overlooked.

It will thus be seen that a multiplicity of things are to be considered before the final cost of an article consumed by a railroad company can be known.

It is observable that those roads operated in the immediate vicinity of adequate markets are supplied more cheaply than lines located at a distance. Their presence in the neighborhood of the dealer exercises an influence favorable to their interests. A company also that possesses a faithful and discreet purchasing agent, or otherwise concentrates its purchases within well defined and responsible bounds, can buy upon more advantageous terms than one that entrusts its purchases to a number of persons or to officers not skilled in the way of buying advisedly or cheaply.*

The necessities of a company, real or imaginary, or its lack of wisdom as manifested in the character of its officers, may, and does sometimes, no doubt, induce it to purchase supplies of an

*No one ever connected with a railway company in a responsible position, it may be said in this connection, can have failed to be impressed by the great importance which the responsible managers of our railroads attach to the organization and performance of the duties connected with the purchase of supplies the companies require in their operations; to the limiting of the purchases to as few officials as possible, and to the placing in such positions only men experienced in the wants of railroads and in the knack of buying cheaply; men withal accustomed to the discharge of acts of trust and of long tried and approved integrity.

inferior quality. When this is so the loss occasioned can not, in the majority of instances, be traced, except indirectly, as in the case of fuel already noted.

For the period of time between 1868 and 1878 the rails in the tracks of a large number of our companies, perhaps a majority of them, were of inferior quality. The times were not propitious; business of all kinds was unprofitable; the companies were poor, and the desire to buy things at a low figure was consequently universal. The period we refer to was intermediate between the use of iron and Bessemer steel; the manufacturers had lost the art of making the former cheaply and well and had not yet acquired the ability to produce the latter at a rate the railroad companies felt able to pay: The effect upon the companies of using poor metal in their tracks was quickly discernible in the consumption of the rails laid:*

It was also perceptible in many ways outside of the greatly increased cost of keeping the track in a condition that rendered the movement of trains possible. It was perceptible in the account for injuries and in the fees of coroners, surgeons and nurses; in the account for losses and damages to property, in the expenditures for legal services,

*The length of time a rail will last is very largely dependent (even upon a line having a light traffic) upon its quality, the care with which it is laid the number and quality of the cross ties; the character of the road bed also influences the period it will last, but it is important, above all, that the quality of the metal should be of the first order and the art of the manufacturer perfect.

in the expenditures for broken down bridges and culverts, for repairs of equipment and other machinery and tools, for labor of various kinds, for the fuel used by locomotives, and finally in the diminished receipts of the property.

Many of the companies were slow in discovering the loss occasioned by the use of poor rails, some of them have not yet discovered it, not a few were dilatory in effecting a remedy after the discovery of the cause. Doubtless it requires a knowledge of railway affairs that the ordinary proprietor does not possess, and can not hope to possess, to enable him to appreciate fully the fact that unless a company maintains a good substantial road bed and track of durable quality of metal favorable results can not long be expected to attend its operations. We can readily believe in such ignorance and can excuse it, but in all practical questions of management of this kind the proprietor should be content to accept the judgment and experience of his manager; it is only when he ceases to regard his advice that we can contemn his ignorance.

The smoothness and elasticity of the track of a railroad affects directly the cost of keeping the rolling stock in condition, and the cost of a poor track is quite as apparent in the large expenditures for keeping the equipment in serviceable order as it is in the enormous disbursements that will be required for the track itself.

Only an experienced and far-seeing manager, I have remarked, can withstand the seductive influence that envelops an article of prime necessity to his company when offered at a low rate. The fact that its ultimate cost will be out of all proportion to the temporary saving is lost sight of or ignored by some. The immediate and visible reduction in the cost of operating and the notoriety that will attach to him for effecting such reduction is too strong for a weak man to withstand. This would not be the case to the extent it is if so great a proportion of the loss which a company must ultimately suffer in consequence of the purchase of inferior material was not unavoidably blotted out or covered up under foreign headings, and remained, in consequence unknown.

The track of a railway company affords, it may be said, the largest single item of expense it has. It is, therefore, in connection with it that the greatest, and in many instances most unadvised effort at economy is attempted. The data afforded by the statistical returns of railroads are too meagre, however, to enable us to accurately and fully illustrate our conclusions. We have, for instance, no exact or reliable data of the actual cost per pound or per lineal foot of changing rails in the track, but we know generally if we attempt to recapitulate the cost that it involves; *a*, the first cost of the new rail less the value of the old at the point of delivery; *b*, the cost of transporta-

tion for both the old and the new material; *c*, the cost of unloading the new and loading the old;* *d*, the actual cost of labor attending the loosening of the old rail and the insertion of the new one in its place; *e*, the value of the chairs, spikes, plates and bolts destroyed during the process; *f*, the wear and tear of tools employed in connection with the work; *g*, the delay of business more or less marked and the expense incident thereto; *h*, the increased wear and tear arising from imperfect alignment of track which the change temporarily occasions; *i*, the injury, however, slight, to the cross ties caused by the change; *j*, and finally, the destruction that is accomplished before the worn and battered rail is taken out and a better one substituted.

The actual cost to a company on account of many of these items can not be ascertained, but whatever the amount may be it is supplemental to the first cost of a rail, and recurs as often as the track is renewed. By keeping these facts in mind we may hope to be able to measurably appreciate the vital importance to a company of its purchasing only good serviceable rails for its track. Only a wealthy company, it is apparent, can purchase any other kind without endangering its permanency and credit. The importance of a durable track is so essential to the prosperity of a company

*In many cases the company has to load and unload both the old and new material, and it frequently happens that the rails are loaded and unloaded several times before being finally disposed of.

that it is no exaggeration to say that the introduction of the Bessemer process, whereby the duration of the rail is much prolonged, has enabled many properties to earn fair and continuous dividends that would otherwise have possessed no value whatever to the owners.

The duration of an iron rail, whether new or re-rolled, varies according to usage and the accident of quality (the latter being quite beyond the control of the manufacturer) from forty-eight hours to thirty-six months; some will not last the stipulated forty-eight hours, while a few will still be in serviceable condition at the end of the allotted three years. It is manifest that the drain upon the resources of a company using such material can not but be out of all proportion to the infinitesimal saving it effected in the first place in the purchase of iron instead of steel.

What we have said in reference to inferior track rails applies with even greater force to inferior cross ties. A poor rail when no longer of use may be sold to the manufacturers, but a cross tie is practically worthless when no longer available for use in the track.* Beside the fact that a worn-

*Huntington, in his unique treatise, page 100, on railroad track, however, points out, though in a somewhat forced way, we think, some of the uses to which old and worn out ties may be put, viz.:

"To patch temporarily broken fences.
To make footings for washing embankments.
For temporary platforms for piling rails.
Fuel for drying sand at sand Stations.
Fuel for section men.
Sawing up old ties for engine-wood is not profitable unless wood is worth $5.00 per cord."

Practically, however, we think old ties are of no use except for fuel for

out tie possesses substantially no value to a company its removal is, in many cases, much more difficult than the removal of a rail, and the alignment of the track is, as a rule, more seriously disturbed in the former than in the latter case.*

The expensiveness of a poor bridge is relatively quite as great as a poor rail or cross tie ; it is greater in some instances. The cost of removing such a structure frequently exceeds the original outlay, it being necessary, in some instances, (notably in the case of drawbridges,) to build a temporary structure by the side of the one that requires removal, while the permanent structure is being erected on the site of the one that is no longer available. Leaving out of consideration, however, all the peculiar circumstances directly connected with the maintenance of cheap bridges, the incidental outlay that they involve for repairs, for persons killed or injured, for property destroyed or damaged, for injury suffered by the equipment of the company caused by their breaking down,

track section men and others located in the immediate neighborhood where they are taken out. Huntington himself seems to be in doubt on the subject, for, in another part of his book, p. 195, he quotes in contradistinction to his own directions as to the numerous and valuable uses to which ties may be put, the regulations of the Atlantic and Great Western Company directing that "all old ties which may be removed must be gathered at the close of each day and put in some convenient place for burning."

*Ties manufactured from what we call soft woods are not only not able to withstand the wear and tear of a heavy business but they decay much more quickly than oak and other hard wood ties. The cost, however, of transporting the latter and inserting them in the track is not greater than for the former; it is, therefore, manifestly for the interest of every company to use the latter when the difference in the purchase price is not greater than the subsequent difference in the length of time the ties will last.

(to say nothing of the loss of revenue occasioned by the distrust of the route engendered in the mind of the community,) is out of all proportion to the saving effected by the erection of a poor structure of this kind. And generally, in reference to the structures of a temporary character, such as depots, round houses, work shops, and water stations, that we find thickly clustered about many new enterprises, the ultimate loss to the company erecting them is double, sometimes treble, the cost, of a first class edifice. The building is but a makeshift at best, its facilities are inadequate, the cost of keeping it in condition large, and its ultimate destruction or removal, with all the expenses incident thereto inevitable.

It follows, therefore, that the erection of such structures is inexcusable, except in those instances, not so frequent as may be supposed, where the resources of a company render it unavoidable.

The injury that may be done to a company's rolling stock and machinery by the use of inferior lubricants well illustrates the folly of buying material of inferior quality. The difference in the first cost between that which is good and that which is not, or is so marked as to secure in many cases the purchase of the latter article. When this is so the direct charge upon the books and in the accounts for lubricants is greatly reduced. This reduction is intended to excite the admiration and astonishment of the directors; it is the

wonder of all who do not fully understand the process by which it is brought about.

The actual cost of the lubricants of a company, when a poor quality is used, is never known: Comparisons exhibit an increased consumption perhaps, nothing more. The first cost is much less; the destruction engendered by the use of the poor quality appears in the returns under other headings, which seemingly have no connection with it, and it remains consequently unnoticed: It appears in the disbursements for repairs and renewals of equipment, for new axles, brasses and other parts of the machinery affected: It will also be apparent in all the accounts incident to the working of trains, such as repairs of equipment, disbursements for people killed and injured, for losses, damages, and for the services of lawyers. Nor does the increased cost end here, it may be traced step by step through all the labyrinths of the service; it is discoverable in the stoppage of trains, in the diminished usefulness of the plant, in the wages of unemployed men, and in the myriad of expenses incident to the detention of business. All such expenditures may be said to follow in the train of hot journal boxes and broken axles, and these disasters are too often preceded by the purchase and use of unfit lubricants.

In considering the cost of car and locomotive

wheels, axles, frames, springs, bolts, nuts, and kindred appliances, we find the relative cost between the good and the bad article is not alone manifest in the price paid for the article itself. It will be discovered that the use of the inferior article materially swells the disbursement accounts for deaths and injuries from accidents, for losses and damages, and all the multitudinous expenditures enumerated above in connection with the use of inferior lubricants, including the cost of repairing tracks torn up by derailed trains, the interruption of business and its manifold losses, the swelling of the account for wages, and finally, the cost of repairing the injured equipment.

Other interests entirely foreign to the immediate purpose of the outlay frequently influence the purchase of supplies. In other words, the purchase of the material is made to accomplish an auxiliary purpose; when this is the case the price paid does not represent so much the value of the article as the benefit to be derived from its purchase; at least the latter must be considered in determining the former.

Many instances continually arise in the history of a company that serve to affect directly the source from which it draws its supplies of material and fuel. Thus a desire to foster the growth of a local manufacturer may induce the purchase of his goods, although the rate may be above the market price. In such cases the indirect gain to

the company is manifestly expected to reimburse it for the additional outlay.

For the purpose of opening up an unoccupied section of country along its line a railway company may, as a matter of policy, adopt the use of wood instead of coal for its locomotives; or it may use coal or ballast of an inferior quality for the purpose of stimulating a local industry, or it may, perhaps, go out of the general market to buy its office furniture and fixtures, its stationery and portions of its machinery and supplies. Practices of this kind are not only possible but they are of actual, though not frequent, occurrence, perhaps, upon our railroads. Generally, it may be said that the emergency that will warrant a company in going out of the general market to purchase its supplies presupposes an extreme case, an event of more than passing interest to it, and not to be considered arbitrarily as a necessary factor in any general review of the subject of railway material.

The interests of a railroad company are identical with those of the country in which it operates. It endeavors, consequently, in every way to advance the affairs of its co-laborer, the local producer. But this assistance, when extended in the manner we have described, is never apparent on the books of the railroad company. When aid is extended indirectly, through the purchase of what the producer has to sell, at a

price above current rates, the additional cost to the railroad company can not be accurately determined or fixed under any appropriate head in its accounts; the separation, therefore, is not attempted, the total amount paid being considered as the first cost of the material, although it is apparent that a portion of such cost might, with more propriety be classed under the head of traffic outlay. But as this is impracticable the gross amount is charged in the accounts to supplies, and appears ultimately in the returns in the account or accounts to which the material was finally apportioned. In this way particular accounts are unavoidably burdened with disbursements foreign to their original intent or purpose.

It is apparent, therefore, that before attempting to fix the cost of operating a company's property we must first know all the circumstances attending the purchase and use of its materials or supplies, the distance that these supplies are hauled, the cost of hauling including service of equipment, the cost of substitution, storage, shrinkage, interest, insurance, the constructive effect, the quantity and quality used, and finally, the price paid, which price, as already stated, is likely to be influenced more or less by purely local causes.

The difference between the state of affairs, as as they actually exist, and as we know they are supposed to exist in connection with the expense,

purchase, and use of the supplies consumed by a company, may be said to illustrate approximately the difference between practice and theory in railway affairs; to the amateur inquirer the railway problem is like unto a shallow cistern to be fathomed with a walking stick, or dipped dry with a drinking cup, but to the practical worker and thinker it represents in its economy all the great problems of a highly civilized society.

CHAPTER XI.

Relative Expenditures for Labor.

We will now consider as next in order the disbursements of a railway company for labor in connection with the operations of its property.

The relative expenditures of different companies on this account are not the same. Various causes conspire to bring about such a result; these causes we can only hope to outline.

The labor account of a railroad is influenced, as we may suppose, by the character of the property, its condition and adequacy to the wants of the traffic it is designed to accommodate. Thus it is apparent that a line advantageously located in a temperate climate can be worked for less than a line not so fortunately placed. It is also apparent that the company that possesses adequate track room, abundant equipment, well placed shops, convenient depots, capacious warehouses, and a well selected store of supplies, can be worked at a less cost for labor than a company not so desirably situated.

The relative outlay for labor is also affected by the character and extent of the traffic. It is

obvious that a small traffic can not be conducted relatively as cheaply as one of greater volume. A business that fluctuates widely can not be accommodated with the same economy that it is possible to handle a business that flows with a steady volume during the season.

The indefiniteness that surrounds the movements of a fluctuating business precludes an accurate estimate in advance of the force required to move it, and this uncertainty operates to the disadvantage of the company interested, for the reason that it must be prepared at all times to accommodate the maximum wants of the public. Again, a traffic that may be conducted with great economy of labor at a certain period of the year would prove exceedingly expensive at another time. Thus the transportation of game during the hot season involves considerable expense for attendance, refrigerator cars, and kindred appliances, while the same business may be conducted during the cold months of Winter with little, if any, greater cost than that which attends the transportation of common merchandise. The same difference is noticeable in reference to the carriage of butter and many other products that we might enumerate.

CHAPTER XII.

Labor — The Circumstances that Govern a Company in the Payment of Wages — The Duties and Wages of Specific Classes of Operatives not the same on Different Roads — The Status of Employes Affected by Local Peculiarities — By the Extent and Character of Business — By Competition, etc., etc.— The Salary an Official Receives Generally an Evidence of the Esteem in which he is held and a Test of his Ability — The Enmity of Superiors sometimes Affects the Salary Paid — The Value of Fixed Employment and Certainty of Pay both to the Employe and to the Company — The Wages Paid by Railway Companies Less than by any other Class of Employers — Favorable effect upon Tariffs — The Progressiveness of Railway Service — The Opportunities for Advancement — Once a Railroad Man Always a Railroad Man — Common Unskilled Labor Governed by the Market Price — The Element of Danger an Important Factor in the Prices Paid for Labor — The Element of Skill, etc.

The wages paid by a company to its operatives are governed by various circumstances, and no single circumstance, it may be said, applies with equal force to different classes of men. And what is more singular still, corresponding classes of operatives do not occupy relatively the same position, nor receive the same pay upon different roads. The local peculiarities of each company

influence its affairs and fix the status of its servants.

Thus, upon lines located in sections of country that offer great natural obstacles to the construction and operation of railroads the engineering department will be found to occupy a position of influence and responsibility that will be wanting with companies whose lines are more favorably located; Upon one line we will find that the superintendent of bridges occupies, in consequence of the responsible nature of his office, a position of considerable importance, and receives relatively a high rate of wages, while upon a neighboring line, where the duties are less arduous, the office is held to be of comparatively little consequence: Upon a heavily worked line, where but one track is available for business, the train manager will be held in high esteem as a necessary and important force in the operations of the road, but upon a line possessing two or more tracks, where the facilities for moving trains are more ample, the duties of the train despatcher will be of a nominal character only, and his pay correspondingly meagre: Upon competitive lines where the procurement of business is surrounded with difficulties the traffic manager will be found to be an officer of exceptional experience and ability, and his office will be clothed with the consideration and power necessary to secure for its occupant the greatest respect possible, while upon lines happily

free from the rivalries of trade the office will not be noticeably different either in the character of the man who occupies it, or the privileges he exercises, or the pay he receives, from those of other departments of the company.

And so if we were to compare each of the general and local officers and their assistants we should find that the power they exercise is never exactly the same upon any two lines of road. And if we should succeed in finding two companies surrounded by the same circumstances and governed by like ability and disposition, the difference in the capacity and character of the persons occupying relative offices would find expression and punctuation in the amount of wages they received.

The pay rolls of a company may be said to afford us, in the majority of instances, the best possible evidence of the esteem in which it holds its servants, more particularly, perhaps, those of a higher grade. The favor or enmity of the manager will, it is probable, be observable in some instances, or a niggardly or effusively liberal policy, may, in isolated cases, characterize a company, but such cases are comparatively rare. In the majority of instances the relative amount of wages paid will afford a test by which we may gauge approximately the fitness and ability of the officials in charge; The same rule applies, to a limited extent, to assistant and subordinate officials as well.

The most important element operating in favor of a railway company in agreeing with its servants as to the compensation they shall receive is the prospect it offers them of fixed employment and certainty of pay. The mechanic assured of continuous work at all seasons of the year, and relieved of anxiety as to the ability of his employer to pay him his wages as they accrue, gladly accepts less for his services than the mechanic who is compelled, from time to time, to remain idle while waiting the pleasure of private contractors, or the petty opportunities for work that are open to him personally.

The railway clerk or accountant understanding the stable nature of his employer's tenure and feeling assured of his own position, does not esteem it a hardship that he is compelled to work for less wages than private firms are accustomed to pay for the same quality of labor. The tenure of the latter can not, in the majority of cases, be prolonged beyond a few years at best, while the stability of the railway company may be said to be as definite and permanent in its character as any thing well can be.

What we have said in reference to the mechanic and accountant applies with equal force to all the skilled labor employed by a railway company.

But for the exceptionally favorable circumstances under which our companies employ the

labor they require of this description, there are but few corporations in the country that could operate their property at a reasonable profit at the rates at present charged for doing business. An attempt to pay the wages common with private firms of respectable standing for the same classes of labor would, it is believed, cripple, if not bankrupt, any railway enterprise undertaking it, unless it re-adjusted its tariffs to correspond with its increased obligations.

In addition to the definiteness of employment offered by a company, it holds out to those of its operatives who are capable and faithful the assurance of ultimate advancement in pay and position. The property may pass into the hands of new owners and directors; superintendents and managers may come and go; the entire *personnel* of the corps of managing officials may be changed, all of these things may and do occur every day without disturbing the subordinate employe further than to occasion him much anxiety of mind. But his anxiety, like most of our anxieties, has no substantial basis or reason for its existence. He is the creature of others, a puppet in the hands of those above him, and his alarm is the fear felt by all of us when in the presence of some one stronger than ourselves, of whose good intentions we are not fully assured. The fear he experiences is not peculiar to men occupying menial offices. It may be said it is common to all classes and con-

ditions of men, (no matter what their habit or occupation,) when brought face to face with influences unforseen by them, or which they are unable to control or accurately define.

The tenure of office of the servants of railroad companies, and more especially those occupying the more humble positions, may be said to be assured so long as they perform creditably and faithfully the duties allotted to them. There are exceptions to this rule, it is true, growing out of the disposition of the officials in charge of the property, but they are of isolated occurrence and are unimportant in nature.

The tacit understanding that exists between the company and the employe, that fixedness of tenure is a part of the consideration received by the latter for his services in lieu of money, is honorably observed by the former. Administrations change, and with them the policies to which they have given birth, but the passive agent who, in the hands of others, has blindly executed these policies is not questioned or disturbed.

The service is also progressive: In the office boys and junior clerks, who are to-day employed by our companies at merely nominal salaries, we may discover the men who will in the future control and direct the management of our railroads. Each year that they serve binds them more securely to the business they have chosen. The

young man who enters the service of a railway company weds himself to a calling that he can not subsequently abandon. With the lapse of time and the growth of prejudice and habit his inclinations and his interest as well, deter him from severing the connection. The associations of the office he occupies, or that he expects to occupy, and the glamor that envelops it, quite as much as the modest pay that attaches to the place, makes any suggestion of change exceedingly repugnant to him.

The wages paid to the cheaper class of labor, such as find occupation with the spade and pick-axe upon the permanent way of a road, is governed largely by the prevailing market price of that kind of work. With the completion of the necessary repairs and renewals of the track each year a large part of the force engaged in the work is discharged, only enough men being retained to perform the nominal labor of keeping the track in order. The same course is followed with the common laborers engaged about the shops and depots of supplies, and in handling a company's traffic. Operatives of this character being readily accessible when occasion calls for their employment, they are not retained longer than their immediate services are required. Any falling off in the traffic of a company, it may be said, is instantly followed, either by a reduction in the force of common laborers or the number of hours

of work, or by both, except at those points where the minimum force only is employed.

The element of fixedness of service so noticeable in every other department is, therefore, wanting in connection with the employment of common laborers. A company, consequently, in hiring its laborers loses, to a certain extent, the value that attaches to this fixedness, and from which it derives so much profit in arranging the wages of employes and agents in other branches of the service. Aside from this element of common labor, a railway company is perhaps less influenced by surrounding prices in fixing the rate it will pay its operatives than any other great employer of whom we possess any accurate knowledge.

Another important element that operates in fixing the wages of certain classes of labor is the hazardous character of the work they perform. Men occupying dangerous positions require to be compensated for the extra risk they run, quite as much as for the work they perform.

The men in charge of the brakes upon our trains and especially the operatives engaged in coupling and uncoupling cars, demand and receive higher wages than laborers of a corresponding class elsewhere. The skill demanded of them in the discharge of their duties is readily and quickly acquired by men of only meagre attainments, and if the work could be robbed of the danger that

attends its execution the pay of the operative would at once recede to a point below the market price for labor of a corresponding grade; the simple nature of the work they perform and the promise vouchsafed them of permanent employment would quickly and inevitably bring about such a result.

The risk incurred by train men generally, and more especially the locomotive driver and his assistant, has the effect, undoubtedly, of enhancing the value of their services, though not to the same extent as those of yard men, for the reason that the danger is not nearly so great, and the quality of the service rendered is of a higher order.

The element of danger in the operation of a company and the expense that it occasions leads the proprietors of our railroads, it is observable, to accept with eagerness every improvement or appliance that lessens the risk incurred by the operative in the discharge of his duties; every such appliance possesses a positive monetary value to the company that can use it. A company has, therefore, a selfish reason aside from the kindly interest it feels in its employes for surrounding its servants with every safeguard in its power; and to the operations of these contrary yet harmonious influences we may confidently leave the duty of attending to the safety of railway operatives.

The skill possessed by the operative and required by the office he fills, affects materially the wages paid him, but not to the same extent that it does for labor of a corresponding grade in other classes of business where the tenure is less definite.

The general and special knowledge of railway affairs which the officers and their immediate assistants bring to the discharge of the duties assigned them is more perceptible in the salaries they receive than in the case of employes of a lower grade, for the reason that the great number of the latter class occupying positions corresponding in grade to each other and having comparatively simple duties to perform necessitate fixed rates of compensation. These rates usually comprise a scale for each class of men, and an operative can not reasonably hope to receive a higher rate of wages than is fixed by the scale for the highest grade of labor in his class, except by promotion to some other department of the service. But as promotions of this kind are of frequent occurrence in the operations of every road the want of elasticity in the scale of wages paid to the lower classes of labor is found not to occasion dissatisfaction or work especial hardships. Those who possess capacity find opportunities of advancement. Those who are lacking in capacity are content with the simple and irresponsible nature of the work they perform, and the certainty afforded them of its continuance during good behavior.

CHAPTER XIII.

Relative Expenses of Railroads — Labor — The Inequality of Wages — Some of the Causes Thereof — The Nature of the Country in which Operated — The Cost of the Necessaries of Life — Competition — Climate — Healthfulness of the District, etc., etc.

The disbursements of our railway companies are greatly influenced, as other industries are, by the nature of the country where they are operating. The circumstances attending the expenditures of even parallel lines are never exactly the same. A fortunate conjunction enables one company to hire at the minimum rate. Another company starting from the same point, perhaps, and operated within the limits of the same State is, on the other hand, compelled to pay its operatives the maximum rate of wages. The great bulk of our roads occupy a position intermediate between these two extremes, some of them approximating the lesser, others the greater. Still other companies there are, doubtless, so fortunately located as to fill the mean between high and low prices.

In those favored localities where labor is abundant and the comforts and necessities of life cheaply and easily attainable, labor of all kinds

commands a less rate than in poor and sparely settled districts, remote from the source of supplies required in the ordinary operations of every day life.

Labor feels quicker than anything else the impulse of competition, and where this competition is the most active there the rate of wages paid will be found most advantageous to the employer.

Every inequality of condition, no matter how trifling, finds expression in the rate of wages paid; thus a company employing men in the mountain districts of Pennsylvania will be compelled to pay more than a company located under exactly similar circumstances, as regards the number and character of population, in central Iowa; the reason of this inequality is not difficult to find. The last mentioned locality possesses an advantage in this, that while the price of food is much cheaper there than in Pennsylvania the cost of fuel and other necessaries of life is not perceptibly different.

The dissimilarity in the cost of doing business produced by the difference in the cost of living, will be found to exist in the extremest limits possible in localities much less far apart than are Pennsylvania and Iowa, a separation of a few miles being sufficient in many instances. This is noticeably the case as between city and country life. The railway employe whose duties lie in

the country where he can school and clothe his family more cheaply than in the city, and where, in many cases, he can raise the fruit and vegetables required for his table, can manifestly work for less wages than his brother who does not enjoy these facilities.

In the practical operations of a road it is noticeable that the operatives who are, from any cause, compelled to pay a high price for the use of the houses they occupy, or the doctors they engage, or the servants they employ, receive a higher rate of wages for their services than employes whose expenses for these necessary purposes of life are not so great. The cost of producing an article determines ultimately its price, whether the article produced be labor or merchandise, or the employer be a blacksmith or a railway company.

The healthiness of a country materially influences the rate of wages paid; this is particularly noticeable in the case of railway companies. A corporation operating in a low, unwholesome district, infected with malarial diseases, does not, and can not hire its employes as cheaply as a company operating in a more salubrious climate. It is, therefore, entitled to special consideration on this account.

The wages paid the same class of operatives by a company working more than one line are seldom the same upon the different lines worked;

the wages paid on each will be influenced by purely local causes, beyond the control of the parent company.

Hence, whatever these causes may be, they must be severally ascertained and weighed, and the effect upon the property ascertained, before we can hope to know what it costs a company to do business. How often considerations of this character, so necessary to an intelligent knowledge of the subject, receive public attention from those called upon to interfere in the affairs of our railroads, we leave to those familiar with the subject to judge.

CHAPTER XIV.

Relative Expenses of Railroads — Labor — Poorly Paid Labor Discernible in the Character of the Service Rendered — No Company can ever attain the acme of Prosperity that Employs Men of Inferior Talent for Responsible Positions — Poor Officials — Collateral Results of the Employment of Inferior Labor — Demoralizing Effect of Excessive Economy in the Compensation of Officers and Superior Officials — The Service Rendered never Exceeds the Price Paid for it — The Laws of Political Economy Immutable — Comparisons of Pay Rolls Demonstrate Nothing — The Relative Cost of Labor is Determined by other Considerations — Exceptions to be Made in the Case of Companies of Limited Means — Labor Affected by the Law of Supply and Demand, and by the Condition of Business in General.

Much that we have said in reference to the use of poor material applies even more forcibly to the employment of men of poor capacity.

It is impossible, in the nature of things, that a company that employs men of an inferior order of talent to fill its principal offices should ever reach the acme of prosperity of which it is capable, and only such a class of officials, it may be said, will remain with a company that systematically depresses the salaries of its servants, or takes unfair advantage of their necessities. A company organ-

ized upon such a basis lacks elasticity and enterprise.

It is slothful in its policy and dilatory in carrying out its conceptions.

The nervous friction of its members retards its momentum and destroys its force.

Instead of advancing with the increased momentum of business it remains inert and dead, like a mind rendered useless by improper application or stupefied by vulgar excesses.

Such an organization can not long prosper in competition with an enterprise of equal facilities that selects its servants with greater wisdom and makes better provision for their personal welfare.

In those exceptional cases, rare indeed in the operations of railway property, where an officer of conceded ability passes into the employ of a corporation whose policy it is to replenish its exchequer at the expense of its operatives, the effect upon him is at once discernible. Aware of his capacity and value to his employer he can not but recognize the injustice of the policy that takes unfair advantage of his wants, however temporary they may be, to reduce him to the level of an automaton. He strives conscientiously, without doubt, against this feeling, a feeling that advantage is being taken of his necessities, but the struggle ends in every case by his succumbing to its influences. His mind revolts at his debasement. How could it be otherwise. He is not, any more than

his employers, ignorant of his ability and worth, and the indignity that is put upon him serves but to destroy his pride and ambition, and in so far as it does this, results to the disadvantage of the employer. Generally, it may be said, that the interest railway officials manifest in their business, and the capacity they display in their management, is in exact accord with the price that is paid for their services.

When a railway official possesses only mediocre capacity he will remain content with an allowance for his services corresponding with his ability, but the value of such services, we feel assured, will never exceed the price put upon them by his employer. We see the truth of this illustrated in many ways in practical life. The law of supply and demand applies not less to railway operatives than to other classes of men, and, as we have said above, the value of the service the operative renders will, as a rule, be governed by the wages he receives; any reduction, every thing being equal, below the standard fixed by common usage, or the necessities of life, or the value of the service rendered, will be followed by a falling off in the quality of such service.

I think there can be no doubt that the losses to a railway company from the demoralization of its force, occasioned by the payment of inadequate wages, will greatly outweigh its petty savings. These losses will be multiplied indefinitely, we

may expect, according to the disposition and opportunity of the party aggrieved, and we do not need to attempt to itemize them, or press them to their furthest conclusions, to enable us to approximate their extent or fatal effect upon the company interested. They will appear in the first cost to a company of its material; in the waste of this material after it is purchased; in the time that is idled away by operatives; in the traffic that is driven off to competing lines inadvertently or intentionally; in unnecessary increase of the force; in the opportunities to create business that are left unemployed, and finally, in the neglect to care for and preserve the property entrusted to them.

In attempting, therefore, to fix the relative cost of labor upon different roads, we must first determine the character of the service rendered, its capacity and intention, and the industry and integrity which it displays in behalf of its employer.

A simple comparison of the wages paid by a company demonstrates nothing, save, perhaps, the short-sightedness or stupid credulity of the management. While a company's pay roll may superficially exhibit a highly satisfactory state of affairs, may exhibit a management pregnant with economical ideas and practices, still, as compared with other and less parsimonious companies, the salaries

it pays may be, in fact, much higher, the relative capacity and integrity of the men being the test.

What has been said in reference to the payment of adequate wages, it is proper to remark, is not intended to apply, and does not apply, to those companies who are really unable, for any reason, to make a fitting return to their operatives. Men everywhere, I have observed, possess an inherent appreciation of the equities of life, and acquiesce cheerfully and heartily in its necessary and inevitable hardships, and the corporation that is, for any reason, compelled to pay small salaries will be served as generously and as faithfully as its more prosperous neighbors.

The local causes reaching beyond the control of the companies interested, that affect the wages they pay, have already been explained at considerable length. These influences appear in the cost of living; in the local coloring of the work and the peculiar circumstances that surround it; in the adequacy of the supply of labor of the kind required, its vicinity to the markets, and in the healthfulness of the country through which the line is worked. When all the surrounding circumstances are the same, a like uniformity may be expected to characterize the outlay for labor upon different lines, provided the disposition of the companies operating them is identical.

But the price of labor will never be the same upon any line for a considerable period of time. It

will always experience, in an accurate sense, the vicissitudes of other values; it will be low and unremunerative in times of business depression, and will grow in volume and productiveness as business improves.

CHAPTER XV.

Relative Expenses of Railroads — The Cost of Operating Affected by the Profile and Peculiarities of the Country — by the Elasticity of Road Bed — Drainage — Ballast — Number and Cost of Bridges — Height of Embankments — Curvature of Line — Length of Tunnels, etc., etc. — Importance of Thorough Drainage — Effect of Cold upon Cost of Operating —Cost of Clearing Tracks of Snow and Ice — Cost of Fencing not the same in Different Localities — Effect of Grades upon Cost of Operating — Heavier Engines Required — Greater Wear and Tear of Track Occasioned — Effect of Curvature — Cost of Operating Affected by the Number of Towns and Stations through which a Line Passes and by the Number of Road Crossings, Signal Points, etc. — Cost to a Community of Unnecessary Restrictions on Trains — Anything that Interferes with the Free Movement of Trains Increases the Price that Must be Asked for doing Business.

As we have intimated already, the disbursement accounts of a line are influenced favorably or otherwise by the peculiarities of the country through which it passes,* and until these peculiarities are determined we can not hope to form an estimate of the cost of operating.

*The cost per mile run on the Milwaukee and St. Paul Railway last year was $1.39, On the Cleveland & Pittsburgh Road it was 54c. per train mile; on the Philadelphia & Reading, 61c.; on the Pennsylvania Road 95c.; and on the Michigan Central, $1.22. Upon 28 Massachusettts roads it averaged $1.28, and upon all the roads in Great Britain, in 1872, it averaged 66c. per train mile.—*Memorial to Wis. Legislature*, 1875, p. 16.

The circumstances surrounding the cost of constructing a road first, and operating and maintaining it afterwards, change with every succeeding mile of country that it traverses; no two miles are ever exactly alike. The distinction is more marked in some cases than in others, doubtless, but it exists everywhere and at all times. In one case it will be the difference between a road located upon the summit of a mountain and one located in a valley; between one that surmounts a steep and dangerous ascent and one constructed upon a perfectly level plain. In another case the difference will be relatively much less marked; it will depend, perhaps, on the elasticity of the road bed, or the sufficiency of the drainage, or the quantity and quality of the ballast that is used or the manner in which it is applied. But however small it may be it will affect the cost of working the property and influence in a corresponding ratio, the price charged for doing business. This difference in cost will vary from a few cents per mile to hundreds of dollars. The extent of the difference in the cost of operating can only be estimated after a careful and exhaustive survey of the property. In some cases it will be so marked as to make itself perceptible to the dullest comprehension, but the nicer distinctions will be little understood or hardly suspected, except by those especially versed in such matters.

A road with costly bridges, high embankments,

precipitous grades, sharply defined curves and expensive tunnels will cost more to operate than a line devoid of these objectionable features. It requires but casual observation to establish this fact; it is patent to all, but where the differences are less clearly defined they are very likely to remain unnoticed or are ignored in determining the comparative expense of working.

In considering the relative cost of operating a line as affected by the country through which it passes we are only able to notice the more important differences that occur to us.

Generally it may be stated as true that a road that traverses a level country adapted to grazing and agricultural pursuits is more cheaply worked than a line differently located. Its drainage may sometimes be difficult and a sufficient supply of ballast will not be obtainable, except, perhaps, at considerable expense, but these objections are more or less common to all roads, and are more than offset by the obstacles that must be surmounted in maintaining a line located in a mountainous or hilly country. The grades and curves of a road may be said to determine definitely the load that it is possible to haul over it under a normal condition of affairs. A company whose property is favorably located in reference to graduation and alignment will be able to haul the maximum number of cars of which a locomotive is capable under the most favorable circumstances;

the reverse will be true in just the proportion that the line falls short of this absolute standard of perfection. Thus it has been demonstrated that upon a line located in respect to gradients and curvatures so as to present the minimum resistance in this regard, of which our roads are generally capable, a machine of a given power will be able to perform three times the service that is possible upon a line presenting what we may properly term the maximum resistance to be met with upon roads completed and in operation.

Not only is a locomotive capable of hauling a greater load upon a line favorably placed in reference to grades and curves, but the wear and tear of the equipment is not nearly so great; the danger of accident from derailed trains is also materially less and the expense of keeping the track and road bed in good condition is not so great in the former as in the latter case.

On the other hand, the drainage of a road that winds through a hilly country or around the edge of a mountain range, or passes over a light and sandy soil, differs greatly in character, facility and expense from a line that is fixed in an alluvial plain. In each of the three cases first mentioned the profile of the country and the nature of the soil present the most favorable characteristics that is possible for the economical and effective drainage of a property. The great difference that exists, it may be remarked in this connection, in

reference to the cost and efficacy of the drainage to be met with upon different lines is of much more importance than, from a hasty or superficial investigation of the subject, seems possible.

To the superficial observer in such matters the difference between a track that is susceptible of perfect drainage and one that is not is so trifling as not to merit consideration. He classes them indifferently under one head and, in his mind's eye, imposes obligations upon them in common without reference to their capacity or the current expense of operating them. Nothing could be more absurd.

Imperfect drainage, beside being an evil in itself, implies many collateral evils. A road that is not susceptible of perfect drainage or that is only partially drained can not, for instance, perform the service that might otherwise be expected of it. The ties embedded in its surface will rapidly decay and its iron rails will speedily become broken or unfit for use. To counteract these and other menacing evils to such a track, a large force of laborers must be kept constantly employed; these laborers must be supplied with the necessary machinery and tools, and frequent renewals of the track itself will be required. The outlay will spread in other directions, directly and incidentally, until it embraces practically every department of a company's service from the excessive disbursements it necessitates for keeping

the road bed and track in condition for use to the payment of the bills of lawyers for defending the company against suits for injuries and losses occasioned by the wrecking of trains.

It thus becomes apparent that the cost of an imperfectly drained track is indefinitely multiplied when compared with the cost of a line that is perfectly drained. For these reasons we have observed that careful railway managers are at all times especially alert to insure for the property under their charge every facility and advantage that the most ample drainage renders possible.

In many instances, however, the nature of the soil or the character of the country in which the property is located renders it impossible to secure adequate drainage. In such cases the difference in the cost becomes permanent.

No other phase of railway operations possesses, it would seem, so great a variety of aspects as the question of drainage, or one that requires greater knowledge and skill. It is not only essential that the person in charge of such work should possess, in a high degree, practical qualities of engineering necessary to enable him to utilize to the greatest advantage the peculiar topographical features of the country through which the line passes, with a view to securing the most perfect system of drainage that they render possible, but he must understand practically, if not scientifically, the action of water upon different characters of soil.

Thus he must be able to distinguish between the quality of earth that will absorb the water that collects upon it without detriment to the road bed and that quality of soil which must be quickly relieved of moisture of every kind in consequence of its too great density or retentive properties. He must also understand the effect of capillary attraction, and, understanding it, take measures to remove beyond the reach of this subtle influence the water that falls upon the roadway or that is precipitated upon it from the embankments and inequalities of surface that hem it in upon either side. In the practical operations of a road it is found that where these precautions are not observed the elasticity of the track is destroyed and its ability to carry the load that presses upon it, without injury to the superstructure or equipment, is greatly lessened.

No phase of railway operations presents greater difficulties to the engineer than the question of drainage, and it is apparent that in any attempt that may be made to ascertain the expense of operating a property this important element in its affairs must not be overlooked or disregarded. Other differences, engendered by location, beside those already noticed appear upon investigation of the subject.

In a cold, inhospitable region the cost to a railroad company of generating steam on its locomotives is relatively much greater than in a milder climate. The load hauled is also less, and

the danger from broken and defective rails is multiplied indefinitely. The absence of elasticity in the road bed when frozen in the winter increases the wear and tear of machinery, hastens the destruction of the rails, retards the active prosecution of the business of the line and in many other ways increases the cost of operating. To these disadvantages, noticeable in a cold climate, we must add the cost of keeping the track free from snow and ice. The disbursements on this account are variable; they appear in the cost of snow plows and other utensils, and supplies, in the wages paid to laborers engaged in keeping the roads open, in the use of locomotives and cars, in the added cost of fences and snow sheds erected as a protection against the threatened danger, and in the loss of trade and in the delay of business that the interruption engenders. Beside these principal items of cost a multitude of petty disbursements, impossible to enumerate or classify, will appear. Upon many of the lines located within the northern belt the expense of keeping the track free from snow and ice forms no inconsiderable proportion of the total cost of operating the property. From these and kindred expenses lines lying further south are happily free.

The difference in the cost of fencing also affects very greatly the relative cost of operating. Upon many roads no fences whatever are required; upon still others their erection is impossible. On

some lines, where fences are required, the outlay on this account is very light, upon others, again, the drain upon the companies is, comparatively, very large. When a company is contiguous to the supplies it requires for purposes of this character the cost will, of course, be much less than upon lines located at a distance. It is interesting to note in this connection that the various State laws defining what constitutes a legal fence are not the same throughout the country, and the expenses, consequently, for construction and maintenance are not uniform, even in those cases where the cost of labor and materials is the same.

The cost of maintaining and operating a road is greatly affected, as we have already stated, by the number and character of its grades. Every foot that a track ascends or descends entails an expense more or less marked according to its abruptness. A line so located as to necessitate the use of heavy and expensive engines can not, it is apparent, be worked as cheaply as a line where light engines are sufficient to meet the requirements of the service, or a line upon which the maximum load can not be hauled without the aid of pushing engines or other auxiliary force, must manifestly be operated at a disadvantage. The cost in the case of grades we find to vary enormously upon different roads, according to the nature of the country, the judgment employed by the engineer in charge of the location of the line,

and the money expended in overcoming the obstacles that the natural surface of the country opposes to a perfectly level road bed; and while experts do not concur as to the ratio of expense that each foot of elevation attained occasions we know that it is relatively much greater when the rise is abrupt than when gradually attained. Thus the cost of operating and maintaining a line where the maximum grade is one hundred feet to the mile, is more than double the cost where the grade is but fifty feet to the mile.

We also know that the expense for other purposes which the gradients of a road entail are not relatively the same. The difference in the cost of maintaining the track, under the variable circumstances we have just described, is not, for instance, relatively the same as the outlay for fuel, lubricants, or wear and tear of machinery:

In each case the enhanced cost is governed by laws peculiar to itself, and must be determined scientifically in accordance with such laws.

The curvature of a track, hardly less than its grades, affects the cost of maintaining and working it, though this fact is not so generally recognized.

Another feature that occupies an important position in the economy of a road is its alignment. A defective alignment affects directly and unmistakably the cost of the property in the first place, and the expense of maintaining and working it afterwards. If the alignment of a road is bad

the inconvenience and the cost that it entails will continue without any sensible modification until the mistake is remedied, but as a defective alignment involves questions of policy and a purely scientific analysis of the expense that the defect entails, as well as the manner and cost of correcting it, it follows that defects of this kind are of longer standing and of much more frequent occurrence than they would be if they came within the easy comprehension of the practical men whose attention and labor are wholly absorbed in matters relating to the roadway and track; an abrupt or unnecessary curve in the line these men may see, and without much difficulty, have remedied, but errors in the alignment of the road, affecting considerable sections of it they do not discover, or if they do discover them they are unable to demonstrate them as such, or the finances of the company interested do not always permit their rectification.

Many peculiarities or differences, other than those we have noticed, are apparent in the affairs of railroads, and affect directly the cost of operating them. Thus a company that is compelled, either by the nature of its traffic, or the peculiarities of its line, to sever and re-unite its trains at frequent intervals, must necessarily include in its estimates of disbursements the considerable extra expense that this labor involves; an expense that will vary with the length of the haul and the

amount and character of the load. Expenses of this kind represent, to a certain extent, it may be said, the difference between a through and a local business: many of the terminal expenses, however, involved in the latter being modified or wholly wanting; this is noticeably so in those cases, where a change or transfer of load occurs in consequence of the necessity of diminishing the burden or of delivering it bodily to some other line.

The relative cost of operating a road is greatly affected, moreover, by the density of the population through which it passes, and the frequency with which towns, villages, and cities recur along its line; it is also affected by the number and character of its tunnels, viaducts and road crossings, or the necessity that exists for such structures.

Every tunnel, viaduct, or road crossing presupposes a state of affairs that will increase relatively the cost of doing business:

A line that is thickly dotted with signals and crowded at short intervals with watchmen can not, it is manifest, be worked as cheaply as a road running through a country where these precautions are unnecessary.

Any thing, it may be said, that interferes with the free movement of trains, or that increases or diminishes the speed best suited to the load they are intended to haul, adds to the expense of operating them. Thus the amount of fuel used by a locomo-

tive is greatly increased by the additional force required to start its load over what would be required to preserve its momentum after once being fairly in motion. Experts estimate the loss of power in stopping a train traveling at the rate of twenty-five miles an hour as sufficient to carry it a mile forward on its journey.* The consumption of fuel and the loss of power, it is also to be remembered, are only lessened, not entirely avoided while the locomotive is momentarily idle. Further than this the expense of the men employed in connection with the idle machine experiences no abatement, and in addition to these items of expense involved by the stoppage of a train, we have the cost of the wear and tear of the road and equipment, besides other expenses of a miscellaneous though less marked character than those specified.

It is apparent, therefore, from the foregoing brief examination of the subject, that any thing that multiplies the restrictions under which trains are operated, heightens their expense and adds to the burdens of the people, by whom they are supported; I say, adds to the burdens of the people, for the reason that the cost of doing business must in all cases eventually be reimbursed by the patrons of a line. Whatever the cost of an article may be, that cost, we know, falls ultimately upon

*"The direct loss of power in stopping a train running at a speed of twenty-five miles per hour would be sufficient to run the train over a mile." *Mr. Arthur M. Wellington's Economic Theory of the Location of Railways*, p. 22.

the person who uses it, and in the case of railroads, (whether operated by incorporated companies or by the government,) the general public is the consumer; and if it suggests or permits the harassment of its servant, the railway company, by unnecessary stoppage or delay of trains, and thereby heightens the cost of doing business, it is manifest that it increases by just so much the amount of its own burdens.

CHAPTER XVI.

Relative Expenses of Railroads — Terminal Charges — Terminal Expenses Dependent upon Location and the Quality of the Traffic — Difference between Freight and Passenger Traffic in this Respect — Some of the Terminal Expenses assumed by Railway Companies not necessarily a part of their Duties as Common Carriers — Custom in England — No Direct Charge made in this Country for Loading or Unloading Freight — Terminal Expense Fully Recognized in Europe and made Part of the Rate Charged — Lack of Uniformity in this Country as to the Classes of Freight to be Loaded and Unloaded by the Owners — What Terminal Expense Comprises—The Cost of Facilities Dependent upon the Accommodations Required, and the Place where the Business is Handled — The Cost of Handling Affected by the Character of the Traffic itself, and by the Market Value of Common Labor — Terminal Expenses not Proportional to the Revenue Derived — Not Affected by the Length of Haul — Local Business More Expensive to a Company than Through — The Reason Why — Terminal Expenses Required for Suburban Passenger Travel — Length of Haul the Prime Element in Fixing Rates — The Injustice of This — The Cost of Terminal Facilities and Handling Properly to be Considered — Also the Cost of Soliciting and Procuring Business — The Variableness of the Latter and its Usefulness to Business Men.

The relative cost of working a property is greatly affected by the quality of the traffic and the length of the haul. This is, perhaps, more

particularly the case with the freight business than it is with the passenger traffic for the reason that the former entails expenses of an unusual character unknown to the latter.

The expenses incurred by railway companies in connection with the loading, unloading, and storage of freight are in some respects foreign to the original intent and purpose of the common carrier and in many instances are not necessarily a part of his office.

In other countries, notably in England and especially in London, the railway companies in many, perhaps the majority of, instances, contract with teaming companies or employ carts of their own for hauling light and valuable articles of merchandise from the depots to the warehouses of the consignees. Much of the freight transported by the English companies is loaded by the shipper directly upon the cars, or "waggons," as they are called. Indeed, it may be said to be the exception where this is not the case.* The maximum rate charged by the English companies is understood not to include either the cost of loading, unloading, or covering the freight. When such services are performed by the railway people, not only do they make a special charge for such ser-

*The box or enclosed freight car so universally in use by us is little known upon the English lines, the flat or open car being employed by them, merchandise loaded upon it being covered, when necessary, with a tarpaulin. This vehicle is much lighter than our box car, indeed it is much shorter and lighter than the flat or open car that we use.

vices, but they also make an additional charge in special cases for the cost of building and working side tracks; indeed, I am not certain that this latter practice does not apply in all cases. In this country, on the other hand, as we know, it is usual for the railroad companies to load and unload all kinds of miscellaneous merchandise, and while they do not attend in any case to either the collection or delivery of the freight at the terminal points, they, nevertheless, place it in secure warehouses, which they own and control.*

No direct charge is made in this country for loading or unloading, no matter what the distance, though, undoubtedly, this service is considered in forming the tariff; nor is any thing exacted specifically for the use of the company's warehouse, except in those cases where the goods are permitted to remain for an unreasonable length of time, say over forty-eight hours, in which case storage is charged, the amount of the charge being well understood by shippers. A charge for demurrage is also made in the case of cars that are not unloaded within a reasonable time, say twenty-four hours after their arrival, when it is understood to be the duty of the consignee to unload the freight.

*The exception to this rule is in the case of the express companies, who conduct what in England is denominated "the parcels traffic"; these companies, organized for the express purpose of carrying on this business, not only collect much of the freight that is transported by them, but they deliver it (in large towns) to the consignee, as well, at the point of destination, the charge for this service (within certain limits) being embraced in the general rate.

No specific charge is made by our companies against their patrons for the use of side tracks.

In England it is well understood that a special charge is made where the traffic is hauled only a short distance. The rate for six miles, or any fraction thereof being the same as for twelve miles; this is in addition to the supplementary charge for loading, unloading, stoppage, etc. Our custom with respect to this class of business is doubtless in practice not materially different from that in England, but the basis for the amount charged is not generally so well understood, though I think, perhaps, this lack of unanimity operates more often in favor of the patron than to his disadvantage.*

The practices that we have described as being in force in this country in connection with the loading, unloading and care of freight have assumed, it may be said, the habit of fixed customs, though it is undoubtedly true that the labor of loading and unloading freight does not in any sense whatever fall within the province of a transportation agent. This is demonstrated, if demonstration be necessary, by the discrimination which the companies make against particular

*In reference to the manner of settlement between the different lines for through traffic, or that which passes over several lines of railway, it is said to be the custom in England to deduct from the gross amount charged for performing the service a specified sum for terminal expenses, varying in amount as between London and provincial towns; this sum is apportioned between the companies receiving and delivering the traffic, after which the balance is divided upon the basis agreed upon, whatever it may be, between the different lines.

classes of freight and in favor of other classes, which discriminations the public openly and cheerfully acquiesce in. However, it is perhaps true that this labor can be performed by the railway companies to better advantage and at less expense than it could be by their patrons; but the prevalence of the custom undoubtedly renders it difficult, if not impossible, for semi-independent companies or individuals to operate special car lines and attend to their loading and unloading.*

It is the office of the carrier to transport the freight that is offered, not necessarily to load and unload it; that is the business of the owner. However, it is our purpose in this connection to notice merely the custom as it exists, not to attempt its change or modification.

The practices of the companies are not uniform throughout the country as to the articles of freight which the owners must themselves load or unload, but vary according to the real or supposed necessities of the business or the character of the men in charge of the railroads. Usually, however, the companies discriminate against only the very coarse articles of freight such as are exceedingly bulky in their nature and not easily damaged or displaced, such as coal, grain, live stock, lumber, ores, pig iron, and similar articles.

*It was curiously enough at one time supposed that the community would provide *all* the cars required to do business and would attend personally to the loading and unloading of freight, while the railway company would simply provide the necessary tracks and, in some cases perhaps, the motive power.

It will thus be seen that a company's outlay for station labor and warehouse and yard room is largely dependent upon the character of its business. If the business is made up of freight that it undertakes to handle, the terminal charges for labor will be proportionately large.

Terminal charges may be called incidental in their character. They are preceded by others of a permanent nature. The latter embrace the cost of the grounds, warehouses, platforms, depots and all the varied machinery necessary to an economical and expeditious discharge of the business of handling the traffic of a company.

Before attempting, therefore, to compute the relative cost of conducting traffic upon different lines of road we must, with other things, first ascertain the amount of the terminal expenses or current outlay for handling the business, and in considering these expenses we must not overlook the original outlay that preceded them, namely, the cost to the company of the station facilities it requires for its business. The outlay on this latter account, it will be perceived, depends upon the amount and character of the traffic and the place where it is to be handled. When the business is light corresponding accommodations will suffice.

The facilities, however, that will cost but little at one point will involve an enormous outlay at another.

The depot grounds and yard room that can be provided for a few cents in an interior town will cost millions of dollars in a great city. The interest upon the capital invested in these facilities, whatever it may be, is a fixed charge upon the property, and must be accurately determined before we can hope to ascertain the cost of conducting the business.

And when we turn to the relative cost of handling the traffic of companies at forwarding and receiving points, respectively, an equally great divergence is perceived. Thus to illustrate, it is a fact that the current expenses upon one line for station labor in connection with the movement of fifty thousand cars of coal, earning a million of dollars perhaps, will be less than those of a neighboring corporation for handling a few crocks of butter or the worn out effects of an itinerant preacher.

Differences of this character continually occur in the operations of railroads.

The relative wages paid by different companies to the men occupied in handling their traffic also vary, it must be remembered, according to the location of their stations and the circumstances attendant upon the work.

The terminal expenses, permanent and incidental, for both freight and passenger traffic are not proportionate to the revenue derived from the business, but are the same in all cases,

whether the traffic is of a desirable character or otherwise. The terminal expense, it is also apparent, is not affected by the length of the haul: It costs as much to handle a consignment of merchandise destined for a neighboring town as it does to handle a consignment destined to a point a thousand miles away;* the number of laborers required is the same in either case; the clerical force must be the same; the facilities must be the same, and the risk of accident or theft at the termini the same.

The through traffic of railroads may be said to represent the long haul in contradistinction to the local business, which represents the short haul, and while the terminal expenses are the same in either case, a local traffic necessitates a frequent stoppage of trains, with all the expenses incident thereto, as already described by us in another chapter; it also involves the expense of uncoupling the train, and taking up, and leaving the cars at the various designated stations along the route; this expense, it is apparent, can not but be considerable under the most favorable circumstances.

It is manifest, in view of all the expenses attendent upon the stoppage of trains and the loading and unloading and storage of freight, as well as the fixed and incidental expense apper-

*"The expense of loading and handling is the same, whether the freight be destined ten or one hundred miles." *Mr. John W. Midgely on the effect of restrictive legislation*, p. 9.

taining to the station plant of a company, that the profitableness of a business is very largely, if not wholly, dependent upon the length of its haul. It is an aphorism in railway management that the equipment of a company earns money only when in motion; this being so, it follows that any thing that retards that motion or destroys it altogether, (as the necessity of loading and unloading cars does, temporarily, at least,) acts to the disadvantage of the earning capacity as well as usefulness of a property.

The station facilities necessary to accommodate the suburban travel of a metropolitan road, to continue our illustration, must be quite as elaborate as for a more profitable class of customers. The relative expense that attends it is much greater than for ordinary traffic, because it is located in cities, or in their immediate neighborhood, where every kind of value has reached a maximum figure; but this character of business, instead of paying a higher rate than traffic requiring less costly accommodations is, in consequence of its extent and the collateral advantages it is thought to bestow, awarded a much less rate, relatively, than business requiring little or no local outlay upon the part of the line conducting it.

This discrimination may be said to represent the difference to a railway company between a wholesale and a retail business; the suburban

residents representing an average haul each day equal to so many trains coming under the former head, while the isolated fragments of business gathered at widely separated points and in uncertain quantities represent the latter.

While it is undoubtedly true that the terminal expenses incident to traffic are carefully considered in fixing the rate in many instances, (especially in the case of isolated shipments for short distances,) it is also true that heretofore no generally recognized or uniform practice has been observed in this respect; the judgment of the compiler of the tariff and the peculiarities of the business sought, and in some cases the law of the State, have determined the rate to be charged without special reference to the exact proportion it should bear of the terminal expense. Perhaps no better method than the one first named is possible; I am inclined, on the whole, to think that, in the generality of cases, perhaps, there is not, though, theoretically at least, it would seem as if the length of the haul in conjunction with the terminal expense should, in all cases, govern the rate.

But as this principle does not govern in all cases it results, undoubtedly, that the terminal expense, permanent and incidental, of a company for doing its business is frequently greater, relatively, than the revenue derived from it: That is to say, the total terminal expenses of doing the

business if apportioned equitably upon the basis of the tonnage or number of passengers carried, without reference to the distance hauled would be found to exhaust whatever profit much of the local and suburban traffic was supposed to afford. Or, to put it in still another light, local traffic, or traffic having only a short haul, can not and does not pay its pro rata proportion of the cost of the facilities it enjoys.

None of our great companies could provide the station facilities they do at many points if their trade was wholly local: the profits they derive from a more lucrative traffic alone renders their outlay for such purposes possible: this more lucrative traffic is their through business; hence it is apparent that the latter contributes in many, perhaps the majority of cases, more than its just proportion of the total expense.

It is the generally accepted belief of the public that the local business of a railway company is uniformly remunerative, for the reason that it is not subject to the disturbing influences that surround the through traffic. This might have been the case at one time, but it is only partially true at the present moment. The multiplicity of roads in operation running parallel with each other, or intersecting each other at short intervals, compels them to compete for their local business, quite as much as for their through traffic; and where this is the case the rates received for the local busi-

ness are not likely to be more satisfactory than for through traffic.

SOLICITING TRADE.

The relative cost of soliciting business, which may briefly be considered here in connection with the terminal expenses of railroads, varies greatly upon different lines.

It also varies greatly for different kinds of traffic.

The expense of one line for advertising matter and for soliciting agents, for illustration, will be treble that of another.

This difference may be occasioned by the disadvantages of a company's lines as compared with those more favorably located; or it may be occasioned by the special character of the business it seeks.

In the former case we might, perhaps, with some show of justice, refuse, in fixing the rate, to consider these exceptional expenses of the company making the outlay, but in the latter case they are certainly pertinent, for the reason that the traffic sought is dependent upon the effort that is made to secure it.

This is especially the case in reference to such business as that afforded by the patronage of excursionists, colonists, tourists, and pleasure seekers generally.

In so far as the practice of advertising, or other-

wise soliciting business, serves to call the attention of the public to objects of advantage to it, the expense thus incurred ought, it is clear, to receive consideration in fixing the rate that shall be charged.

From the foregoing brief and imperfect consideration of the subject it is apparent that the cost of handling and soliciting traffic is an element in the economy of railway management that must not be overlooked in studying the extent, object, and general usefulness of railway disbursements and the return they should render to the companies making them.

CHAPTER XVII.

The Fixed Expenses of Railroads* — Variableness of the Proportion that Fixed Expenses bear to Total Expenses upon Different Roads — Some of the Items of Fixed Expenses — The Minimum Force — Cost of Maintaining the Organization of a Company — Delivery of Mails — Expenses of Regular Trains — Salaries of Station Officials, General and Local Officers, Heads of Departments, etc., etc. — Provision must be Made for the Maximum Business that may be Offered — The Officials and Operatives of a Company must be Chosen with a View to Possible Emergencies — Constructive Expenditures — Expenses of Management — The Effect of a Steadily Increasing Traffic — When a Traffic Ceases Temporarily to be Remunerative — Illustrations: The Advantage to Railway Companies from the Fact that an Increase of Force is Generally Necessary only in the Cheapest Class of Labor — Mechanical Force Required, not Constructive Ability.

The expenditures of a railway company do not grow relatively with its traffic. The outlay upon a heavily worked line is not proportionately as great as upon a line less busy. One of the reasons is that a large proportion of the disburse-

*The term fixed expenses or charges is used in a double sense in railway nomenclature; first, it applies generally to the operating expenses, interest and rentals of railroad companies, and second, to those expenses connected with the immediate working of the property that are not affected at all or only lightly by the amount of its traffic, such as superintendence, salaries of station agents, flagmen at crossings, bridge tenders, etc., etc. The term is used in the latter sense in this and in the succeeding chapter.

ments of a company come under what are called fixed expenses. Many of the expenses of this character are not affected at all, or only remotely, by an increase or decrease of business. And while the amount of these expenses is not the same relatively upon different roads they represent, however, in many instances a handsome income on the total cost of the property. The fixed expenses of a company may be termed the minimum cost of operating; they must, therefore, first be provided for; afterwards every dollar of income that a property can be made to earn without increasing such expenses, represents relatively, it is obvious, an enormous gain; this fact is well understood and represents a principle that lies at the foundation of business, the principle of granting a reduced rate in cases where the trade offered is in unusual quantities or can be secured only by such a reduction.

The difference in the relative cost occasioned by the fixed expenses of roads may be said to vary in proportion as their business approaches the maximum capacity of which the property is capable; this difference, it will be found, varies from a few mills per cent. of traffic to five or six cents, according to the extent of the business.

A brief summary of the principal items of expenditure, embraced under the head of fixed expenses may properly be introduced here; and first, we may mention those relating to organiza-

tion. The organization of a company, it is apparent, must be maintained with but little, if any, reference to the amount or profitableness of its business; all its affairs are immediately dependent upon the preservation unimpaired of its legal status in the community. The obligation is, therefore, imperative, and while the disbursements of a company on this account may be small compared with many of its other expenses, they are, nevertheless, considerable in amount each year. Then the expenses incident to the conduct of business intervene without much, if any, reference to the amount of such business in many instances. Thus the mail must be delivered punctually, no matter how small it may be; the convenience of the public must be studied and provided for at stations and elsewhere and the number of trains which the custom of the country or the charter of the company compel it to operate must be run each day.

In such matters as these the discretion of the manager is very limited indeed; the obligation is arbitrary.

The outlay incident to the movement of trains necessary to accomplish the purposes we have named is the same substantially, so far as the wages of men engaged in operating them is concerned, whether the cars they contain are loaded to repletion or travel comparatively empty.

The same is measurably true in reference to

the force of men employed at stations. The officials in charge at stations are indispensable; they attend to the immediate wants of the agencies left under their care; they open the company's waiting rooms, see that they are kept clean and comfortable, preserve order in and about the buildings, keep the platforms and tracks unobstructed, ticket such passengers as present themselves, receive and discharge the goods entrusted to the company employing them and answer intelligently the questions asked of them by the patrons of the line.

The agent also attends to the switches in his immediate neighborhood, looks after the cars left upon the sidings in his vicinity and renders such returns and accounts of the business of the company as its interests may require.

The wages paid for the performance of these important offices must be such as to secure faithful men competent to perform the maximum amount of service required of the positions they severally occupy. And so it is with the organization of the force as a whole; the general and local officers, the superior and petty heads of departments, and the foremen and persons in charge, including their principal or chief assistants. Each of these must, in his place, be competent to perform, at a moment's notice, the greatest amount of service that the necessities of the company may at any time exact of its ser-

vants. The exigency arises and passes like the flight of an express train; there is no time for consultation; no time to study text books, no time to examine rules and regulations, or to write to a superior officer for instructions. The emergency must be satisfied then and there, promptly and creditably.

An agency that may, at any moment, be called upon to handle a hundred car loads of freight can not with safety be entrusted to the care of an agent who could manipulate half that number with facility, but would break down under greater responsibility. The station agent must, in his turn, select subordinate servants with a view to like contingencies. What is true in this respect of the agent and his assistants applies with equal force to conductors of trains, to foremen of shops, to track bosses and superintendents of bridges.

It applies with redoubled force to the corps of managers.

The exigencies of the service require men of special training, of peculiar qualifications, of minute practical knowledge. There are no important exceptions to this rule in any of the departments or branches of the business. Supervisory officials, and especially those in immediate charge of the property, must be relatively as well skilled as the directing manager of the company's affairs. They must possess a general knowledge of the

office they fill as well as a particular acquaintance with the peculiarities that are special to the immediate position they hold. This general and particular knowledge involves an intimate acquaintance with the property, its defects, its resources, and its peculiarities. This intimate acquaintance presupposes prolonged association, years of observation and thought. Their highest attainment is impossible otherwise; without this prolonged association the knowledge they bring to the discharge of their duties is enfeebled and oftentimes unwise and impracticable.

The *personnel* of a railroad organization may not, therefore, be changed hastily or unadvisedly without detriment to the property. For the property, as we have already stated, is but the creature of the operative; its value is dependent upon his capacity and his fidelity to its interests, and he must ever be considered in attempting to form an estimate of its present or prospective productiveness.

In every department of railway service we discover carefully selected men, men of capacity and resources; the superiors of their fellows, they are singled out with reference to the emergencies, either present or prospective, in the particular field they occupy. From the character of these men we may judge intelligently of the discernment and trustworthiness of the managers in charge of the property.

The relative importance of the duties, present and anticipated, performed by the various classes of officials is more or less apparent from the compensation allotted them. The official in charge of a pass high up on a mountain side, or having the care of a difficult morass or hazardous piece of track, no matter where it may be located, is paid a higher rate of wages than his neighbor, whose skill and whose responsibility is less. Selections in every case must be based upon fitness: The track foreman that might be trusted with safety in the absence of danger could not, perhaps, be depended upon to act with intelligence and precision in case of a wreck or the washing away of a road bed. A bridge superintendent that, perhaps, understands how to keep in repair the property intrusted to his charge under all ordinary circumstances, might be exceedingly awkward if called upon at a moment's notice to construct an entire structure; and in the same way the conductor that might know how and when to start or stop a train, might know how tickets should be collected or cars received into or detached from a train, would not, perhaps, know what to do in case his train was thrown from the rails, or had lost its right to the track, under the schedule, as against another train.

Hence, in the selection of men to fill petty offices of responsibility, as well as those of greater degree, all the varying circumstances that govern

the office to be filled must be carefully considered by the appointing power. The selection of the fittest for these positions, and the continuance of the incumbents in the service require frequently the payment of extra wages. And thus it follows unavoidably that extra wages are paid oftentimes to meet exigencies that never arise, just as expenditures of a similar character are unavoidably incurred in other branches of the service. These disbursements we may term constructive expenditures of capital. They are much the same upon all lines, without particular reference, in many cases, to the business that is done.

The cost of caring for a property is not affected by what it earns to so great an extent as we might suppose. A competent and trustworthy manager must be employed to look after its affairs and preserve its integrity. The amount paid him for such services is of necessity dictated rather by the extent of the property and the ability and faithfulness of the man rather than by what it earns. This is true to a certain extent of all the officers of a company that are necessary to its operation. With a few exceptions, however, the salaries of minor officers are more dependent upon the business that is done than is that of the manager or superintendent. It is true also of many of the subordinate servants of a company, the amount of salaries paid them or a large proportion of such salaries at least being a part of a

company's fixed expenses, and not dependent, except in a minor sense, upon the amount of business done.

At the headquarters of every company a complicated and expensive force must be maintained. This force is the brain of the enterprise, its directing power, without which the organization would fall to pieces of its own weight.

Aside from the responsible officers in charge of a property, skilled assistants and accountants are necessary in all the departments of the service. These assistants are the immediate agents for carrying out the determination of the company as expressed day by day through its officers. They must, accordingly, be experienced and discreet men, disciplined in their office and capable of exacting from others the respect necessary to the discharge of business. The number and salaries of these assistants are not materially influenced, either favorably or unfavorably, by the fluctuations of trade, except when it extends over a considerable period of time. They may be said to be fixed in the offices they occupy; a temporary increase or decrease of traffic does not affect them either favorably or otherwise. The explanation of this is found in the difficulty of filling their places acceptably. The knowledge they possess is the result of laborious training, of years of familiarity with their particular duties, and, except in those cases where the depression in

business is very considerable or likely to be prolonged for a considerable time, it is inexpedient as well as expensive for a company to make any change or reduction of this class of officials. And this is equally true of a large part of the force operating our roads.

A reduction of wages is practical as well as desirable in many cases, but a reduction of the force below a fixed number is impossible.

The traffic of a company may be paralyzed by a great storm, or its business may be partially disturbed for a time by the failure of a crop, or by the diversion of its trade, by the occurrence of a disastrous epidemic or from any other of the many causes that affect the prosperity of the country, nevertheless, its fixed disbursements remain practically undisturbed. And herein lies a partial explanation of the ability of a company to lessen its rates from year to year so long as the volume of its business shows a satisfactory increase. Up to a certain point any addition to the traffic of a company is not followed by a corresponding increase either in the number or the wages of the men it employs. There is, for instance, no perceptible increase in the number or the pay of watchmen at crossings and bridges, the track patrol, the persons in charge of tunnels or swing and draw bridges; there is no increase in the number of agents at stations, of the principal ticket sellers, of the men employed in connection

with the customary trains, of the foreman and his chief assistants, who are busied in keeping the track in order, or of the minimum force required at shops and round-houses, and at the various depots of supplies; neither is there any increase in the number or pay of the corps of officers and their confidential and necessary assistants.

This list could be increased still further if necessary.

When, however, the traffic of a company increases beyond the maximum capacity of the officials and operatives necessary to do the minimum amount of business* its expenditure for wages will increase, temporarily at least, beyond what the comparative profitableness of the traffic warrants; this relative increase in the cost of doing business will continue until the traffic again reaches a point where the maximum amount of labor possible is exacted of the increased force.†

Within certain limits, not possible to clearly define, the elasticity inherent in every well appointed organization enables it to accommodate an increase of business without any addition to its machinery or the number of its servants. Just as a considerable increase is possible in the number of

*With many classes such as watchmen, flagmen, patrolmen, agents and bridge tenders, it never reaches this point.

†This increased cost, relatively considered, will continue even after the increase in the business reaches a point where it is sufficient to compensate the proprietors for the additional outlay.

guests at a hotel without any addition to the force of attendants; let us suppose the maximum of this increase to be fifty guests; this number may be added without increased cost for service to the proprietor; but at this point the addition of a single guest will necessitate, we will say, the employment of an additional clerk, another waiter, an assistant porter, and so on through the list of attendants.

The outlay incident to this increase of his force is, of course, out of all proportion to the income derived by the proprietor from the additional guest and has besides the further effect of increasing the relative cost of operating his house.

And so it is in the working of our railroads. We will suppose that a passenger train is added to the list of those already operated by a company. Only a small percentage of the patrons of this new train, we may suppose, are made up of new passengers. The traffic of the line has simply readjusted itself to conform to the increased facilities afforded it. The convenience which the new train offers the public, which it did not before possess, may add a few passengers more or less, but there has been no marked addition to the business in consequence of it, and until there is an increase of traffic commensurate with the added facilities, the company is actually or relatively a loser by the transaction; for the reason that under

the new order of things its train service is performing only the minimum labor of which it is capable, while it had before performed the maximum amount.

The same rule applies with equal force to what we term freight trains.

It is noticeable in all departments of the service.

At a certain point in the growth of a traffic the outlay it induces is much greater, relatively, in many cases, than the immediate income from it would justify. The subsequent growth of business may warrant the increase, or it may not; In determining such questions, and they are of continual occurrence in the operations of a railroad, the judgment of the officer upon whom the responsibility rests is likely to be colored and confused by influences of a more or less personal character, so that intelligent action is not to be expected in all cases. If trade appreciates, then the increased outlay will be justified and will ultimately be reimbursed, but up to a certain point, in any event, the increased outlay is a positive loss to the company, and its occurrence a question of doubtful expediency.

There is this, however, always to be remembered in connection with additions that are made to the force of a well appointed railway company, namely, its compact and well disciplined organization enables it to utilize without detriment to the

morale of the force already in its employ, the cheapest quality of labor of the kind it needs, that can be found in the market; the relative increase in the number of operatives is, therefore, not attended with a corresponding increase in the wages that are paid: The organization requires to be strengthened by the addition to it of mechanical force, not constructive ability.

The effect of this addition, under such favorable circumstances, is to reduce the average cost of doing business, thereby enabling the company to care for its traffic at a less rate, relatively, than it otherwise could.

CHAPTER XVIII.

Fixed Expenses Continued — Fixed Charges other than for Labor — Interest on the Permanent Investment — Local Taxes — Fixed Guarantees — Rents — Renewals of Fences, Gates, Crossings, etc. — Maintenance of Permanent Property Largely Dependent on Natural Causes — The Cost of Preserving and Repairing Machinery — The Fuel, Water, and Lubricants Necessary to Operate the Minimum Number and Weight of Trains — The Minimum Cost of Running a Train — The Expense of Organization — General and Legal Expenses and Insurance — Practical Conclusions.

As a rule the increase of a business is greater relatively than the additional expenditures that such increase occasions for the reason that many of the disbursements of a railroad company, as explained in the preceding chapter, are in the nature of fixed charges. These charges are exceedingly varied in their extent and peculiarities. In the preceding chapter we pointed out, more particularly, the influence they have on the relative cost of labor; their effect is quite as marked in other departments of the service: The disbursements, for instance, for interest on the permanent investment are not affected even remotely by the fluctuations of business. This is

equally true in many States in reference to the local taxes, the assessments being based upon the value of the property rather than upon the revenue earned by it.

Many of the guarantees which the vicissitudes of business compel a company to enter into are so fixed as not to be affected one way or another by the amount of its earnings.

The amount paid for the rent of buildings and grounds is only nominally affected by the quantity of the business; the volume of the traffic may temporarily increase or diminish without disturbing the annual expenditures on this account. Any permanent decline of the business of a company will, of course, in the end necessitate a readjustment of its contracts and leases, but as the buildings and grounds occupied by it are usually esteemed imperative, and the agreements connected with them are entered into for a series of years the expenses they entail can not be lightly or hastily diminished.

The cost to a company of keeping its fences, gates, and crossings in order is not increased or diminished, or not perceptibly so, at least, by the business it does. The amount disbursed for these purposes is dependent upon other causes, over which a company has comparatively little control.

The expenses of keeping up the permanent structures of a company depend quite as much upon the natural influences of the seasons as

upon the business that is done; under the most favorable circumstances its bridges and culverts will rapidly crumble to pieces, its buildings will fall to the ground or become unfit for use, its fences, gates and crossings will rapidly succumb to merely climatic influences, its embankments and cuts will become unsafe, its ditches will become clogged or entirely filled up, its road bed will become worthless for lack of ballast and careful attention, and its cross ties will decay while the iron or steel rails that they support and hold in place will rapidly resolve themselves into their original elements. All these things will be brought about by natural causes alone, whether the business be light or heavy, if a constant stream of money, proportioned to the extent of the property, be not poured out upon it by the proprietors from day to day with careful and unceasing attention.

While the magnitude of the expenses of a company depends very largely upon the nature and extent of the renewals required, these renewals are influenced more or less by the length of time the property has been in operation, and by the thoroughness with which the work was originally performed. At first these expenses will be very light upon a well constructed property, but with the lapse of time they will steadily increase in volume, the maximum sum being reached at the point to which the average life or durability

of the property of a railroad company may be said to extend; this period will vary in different sections and under different circumstances, according to the climate and the nature of the material that is used, and the amount of business done: Under the ordinary circumstances of operation this average should not be reached under ten or twelve years, the average durability of rails, cross ties, spikes, equipment, platforms, and fences being in the neighborhood of seven years, while the durability of a company's buildings, fences, permanent bridges, culverts, and similar property will be very much longer.

Generally, it may be said, that the amount of business done will determine the duration of the machinery employed in conducting it, while the weight of the load and the velocity with which it is moved will determine the duration of the rails, cross ties, road bed, etc.

Turning to another feature of the case, the machinery of railroads, we find that the difference between the wear and tear of used and unused machinery is not nearly so great as it would seem to be at the first glance. The expense of preserving unemployed property of this description in good order is not noticeably less, as every manufacturer is aware, than the cost of keeping it in good condition when actively employed:

The subtle influences of idleness seem to be

as destructive in this case to man's work as idleness is to man himself.

The machinery he constructs with such infinite care and labor requires the occupation and attention designed by him, and without this it rapidly deteriorates in value and usefulness.

The amount of coal or wood that is necessary to haul the minimum number and weight of trains upon a road is in the nature of a fixed charge; the quantity of fuel consumed by a locomotive attached to a train of thirty cars is not relatively as great as when hauling one third that number, while all the appurtenances that are necessary to the successful operation of the train are practically the same in either case;

The lubricants used upon the locomotive are substantially the same, whether the number of cars hauled be ten or thirty;

The lights and furniture are also the same;

The conflagrations which the locomotive unavoidably causes are the same;

The accidents to the train are practically the same;

The same number of incautious people are killed or injured at stations and crossings;

The same number of vagrant cattle are run over and crushed;

The same number of switches must be turned at the meeting points of trains;

The telegraphic orders that pass back and forth between the different train officials are the same;

All the varied expenses connected with the use of water are practically the same, from the cost of the fuel used for pumping purposes to the amount of alkali expended in cleaning the boilers of locomotives.

As we have already stated, the expenses for keeping up the organization of a company are not noticeably different, whether its business is large or small, or is productive or otherwise. All the varied expenses which the complicated laws under which it operates require must be met without much if any reference to its traffic receipts; bulletins must be exhibited as the law prescribes; tariffs must be promulgated, agreements must be made, notices of elections must be duly posted, trustees must be remunerated, the traveling expenses of the managing officers must be met, numerous complicated and expensive exhibits and returns must be made to the officers of State appointed to receive them, lawyers must be employed as advisers and advocates, and such insurance as the nature of the property demands must not under any circumstances be allowed to lapse.

All these expenses are inherent and are in no wise dependent upon the volume of business or its productiveness.

When, therefore, we observe a partially loaded train winding its way across the country, or

remark a storehouse or yard filled with idle locomotives and cars, we must not jump hastily at the conclusion that the owner thereof has reduced his expenses so as to make them conform to the amount of business he is transacting or that it is possible or practicable for him to do so; on the contrary, we may truthfully believe that the bulk of his expenses have not been abated at all, these expenses being so circumstanced and governed in their character as to render any material reduction of them impossible.

CHAPTER XIX.

Relative Expenses of Railroads — The Cost of Operating Affected by the Adequacy of the Facilities Necessary to do Business —Necessity of Making Renewals and Repairs at the Most Convenient Season of the Year; the Best Appliances Necessary to their Economical and Rapid Performance — Losses of a Company from Lack of Equipment — Costliness of a Superabundance of Equipment — The Interest on the Cost — Its Repairs and Storage — Some of the Consequences of an Injudicious Effort to Keep Idle Equipment Employed — Diversion or Loss of Revenue Caused by Insufficient Facilities — Consequent Loss to the Owners — Companies Deficient in Facilities Unable to Compete Successfully with Rival Lines — Insufficient Facilities Generally Not the Fault of Managers — The Wants of a Property Often Ignored by Its Owners — The Policy of Inaction in such Matters and Its Consequences — The Great Importance of Being Able to Make Renewals and Repairs when the Occasions Arise — Necessity of Keeping Equipment Clean and Well Housed when Not in Use — Economy of Using the Best Appliances in Every Department of the Service.

The cost to a railway company of operating its property is affected favorably or unfavorably, according as the facilities it enjoys are ample or otherwise.

To enable it to secure the most favorable results possible in operating its property it must be

able, for instance, to carry forward its repairs and renewals at the most convenient season of the year and must possess the appliances best fitted to their economical and rapid performance; in other words, it must be in good condition financially and must possess machinery amply fitted to its wants and adequate to carry on its work with the least outlay possible for current expenses.

The differences so noticeable in the cost of working railway properties are largely attributable to the differences in the facilities enjoyed by their respective managements.

To illustrate: a company that does not make adequate provision for transporting its traffic as it arrives, that is not provided with adequate equipment for doing its business, will be compelled to suffer many expenses and losses that under different circumstances might have been avoided. It will not be able to perform the service at the opportune moment, and will, in consequence, be put to such additional expenses as the delay entails. In addition to this loss, the traffic that is for the moment without accommodation will, when it can, seek other channels and the revenue from it will be lost. Thus the actual current expense of working the line will be increased in many cases, while the loss of business will swell the proportion that the expense of operating bears to revenue.

A superabundant equipment, on the other

hand, is not less costly in many cases to its owner. Its possession involves an annual loss equal to the interest on its cost, also the current expense of keeping it in order, including the outlay incident to the provision made for its storage. In addition to these simple and direct losses, engendered by a superabundant equipment, the effort to give it employment is quite likely to lead its owners and managers into all kinds of excesses; it will lead them to attempt, among other things, to stimulate injuriously the growth and progress of commercial affairs, to create business at abnormal seasons of the year and at points not natural to it and not adapted to its wants. In their effort to find employment for the superabundant equipment they possess they will encroach upon the territory of neighboring companies, and to the other losses we have enumerated will be superadded the losses that follow from destructive competition between rival enterprises, and thus a too abundant equipment will introduce into the affairs of railroad companies an element of demoralization more subtle and more destructive to them ultimately than any immediate loss of business would have been.

The disposition on the part of railway companies, we may say in passing, to encroach upon the territory of each other, coupled with a belief inherent in many of their operatives that they can create business of a legitimate and permanent

character by lavish expenditures or weak concession has been the prolific cause of most of the disasters that have shipwrecked the fortunes of so many of our companies.

What we have said in reference to the necessity of restricting the machinery and rolling stock of a company within necessary and proper bounds applies equally to its property as a whole. While the property should, if possible, be maintained at a point commensurate with the wants of business any surplus a company may earn or possesses after supplying such wants should be divided among its owners. Contingent wants of the future that may perhaps never occur should, under no circumstances, be anticipated with present receipts, but should be left for the action of the owners of the property as they arise.

While the owners of a property should thus restrict themselves in reference to indefinite possibilities of the future they should remember that active prosperity or prospective profit can not be expected from a road not provided with accommodations adequate to its present requirements. When its wants are inadequately or improperly provided for, the revenue that would be available for extending or strengthening the property or that might be divided among the shareholders will be required to meet current expenses that, under more favorable auspices, would not exist. A company thus unhappily placed can not, it is need-

less to say, compete successfully with its more fortunate rivals; despised by its enemies, its credit called to account, and its operating expenses out of all proportions to its earnings, it will be avoided by the classes that would, under other circumstances, give it encouragement and support.

There are but few of our railway managers, it must be said, who do not understand the importance of keeping the property entrusted to them in good serviceable condition. The difficulty is, and always will be, to make the owners, or their representatives, equally alive to this fact. Absorbed in the prospect of a generous dividend and secure in the belief that the management is able to provide the necessary ways and means for meeting the improvements that the property requires, they lack apprehension and interest. They do not refuse to make provision for the company's wants, they simply ignore them. To meet together from time to time, and after much desultory talk, calmly authorize the expected dividend, is to many directors the sole object of their office. They listen with a smile of approval to the remarks of the chairman, and congratulate the manager upon his energy and efficiency, after which they disperse to their several places of abode well satisfied with the zeal which they have displayed in watching over the interests of the property entrusted to their care.

It is in ways such as these that the wishes of railway managers are often ignored, and their strength crippled or negatived. The truthfulness of this is apparent to the observer in many ways, and it is perhaps, needless to say, that the losses resulting from the policy of inaction, to which the companies are subjected, are unnecessary in many cases, as well as disproportionate to the temporary saving effected.

Instances multiply themselves indefinitely, when we come to consider the desirability of a company being supplied with all the auxiliary aid necessary to an economical conduct of its affairs.

The company, it may be said, that does not possess adequate tracks, convenient sidings, and sufficient yard room can not handle its traffic with the celerity and economy that it could if it possessed these necessary facilities. The company that is able to make its track repairs and renewals at the period of the year most advantageous for such work will be able, manifestly, to do so more economically and effectually than its less fortunate neighbor.

It is essential, above all things, to the prosperity of a company, that it should be able to make its repairs and renewals as occasions for them arise; an unsafe bridge, an insecure culvert, or a defective axle or car wheel may involve the destruction of a passenger train, which, with the losses collateral to it, will amount to hundreds of

thousands of dollars and extend over a long period of years. The losses that result to a company from accidents of this kind, whatever they may amount to, can never be known, even approximately, for the reason that they entail a loss of the confidence of the community at large, in the safety of the company's property, and in its methods of doing business; thus, to the direct and known losses incident to a disaster of the character in question, there must be added the unknown losses from the diversion of traffic, caused by the feeling of distrust in the minds of the public. It is in the details of operations, however, that the losses accruing from improvident management are most marked; this is especially apparent in connection with the road of a company; thus, a worn and battered rail left in the track of a busy line will so disturb and rack the equipment passing over it that the cost of repairs to the latter which it engenders will many times outweigh the value of the new rail required to replace it; the same is true of a line imperfectly ballasted, or one where the alignment is faulty, or the drainage neglected.

The cost to a company of keeping its locomotives and machinery in good condition will depend very much upon the carefulness with which it keeps them cleaned and housed when not in use. The rolling stock that is kept well painted and in good repair will not be so expensive to main-

tain as the equipment that is neglected, and while the present outlay for cleaning, housing, and painting may be a severe tax upon a company, it can not but result in a higher prosperity and more satisfactory returns to the owners.

And what we have said in reference to the machinery and rolling stock applies to every branch of the service. The increased disbursements, to illustrate, of a company to meet the interest on money expended for overhead bridges and viaducts at busy points will, there is no doubt, be more than counterbalanced by the increased economy of operations that will follow; it will be observable in the saving in the wages and other expenses incident to flagmen at crossings, and in the freedom at such points from accidents of all kinds, and the outlay that they involve.*

The wisdom of providing the best appliances available for conducting the business of a company, will, in the majority of cases, be perceptible in the immediate decrease of expenses which they render possible; thus the introduction of a new piece of machinery, a copy press, a patent ink, a blank form or other contrivance intended to simplify and cheapen, frequently renders a material reduction of the force possible, or prevents an otherwise inevitable increase. Innumerable illustrations of

*These facts are well understood by railway managers, and wherever the finances of the companies will admit of it, and the circumstances of the case warrant, the officials in question are everywhere busy erecting overhead bridges in place of the cheap contrivances introduced in the first stages of railway construction.

this character might be cited if necessary, to demonstrate the truthfulness of this statement.

The usefulness and prosperity of a railway company, it may be said, is indefinitely heightened and prolonged by maintaining its plant in a high state of efficiency; this is more particularly the case with its machinery and equipment. Property of this description should be maintained at the maximum state of efficiency of which it is capable; the duration of a car, or locomotive, or a stationery engine, may be almost indefinitely prolonged by prompt and careful repairs of the various parts as they are rendered necessary, while a neglect of these necessary details will hasten the general breaking up of the whole structure.

And finally, what we have said in reference to the adequacy of a property, and the necessity of properly preserving it may be supplemented by the general statement, so familiar to the thoughts of railway managers, that the amount that is divided among the shareholders of a company should, in all cases, be the surplus that remains after satisfying every necessary want of the property; that no part in fact of the revenue necessary to the maintenance of the plant should ever be put aside for division among the proprietors of the enterprise. That the surplus applicable for division will ultimately be greater and more enduring where such a policy is followed than where a contrary course is observed, no one familiar with railway affairs can doubt.

CHAPTER XX.

Relative Expenses of Railroads — The Economy of Operation Directly Dependent upon the Ability, Experience, and Faithfulness of a Company's Servants — Necessity for a Trustworthy Management — Qualities Requisite in a Manager — Value of Associations of Railway Officials — The Rut of Provincialism — The Capacity of Managers Tested by Comparisons — In Making such Comparisons their Full Significance should be Understood.— The Proportion that Expenses bear to Earnings no Test in Itself of the Economy of a Management — The Responsibility of the Traffic Manager — The Folly of Injudicious Concessions — The Causes that Give Rise to Them — The Annual Decrease in Rates — Where Will it End — The Outcome — The Loss of Prestige an Increase of Rates must Occasion — The Reasons Why our Companies have been able to Greatly Reduce their Rates and yet Make a Profit on their Business.

The expense of operating the property of a railroad company is greatly influenced, as every person familiar with the subject is aware, by the ability, experience, and faithfulness of the persons in charge of it.

The success of an enterprise may be said to depend upon the trustworthiness of its officers and operatives.

While those who foresee the utility and profitableness of an enterprise or who are re-

sponsible for its active inauguration, may be able to forecast its future with far-seeing sagacity, still its usefulness to the public and its value to its owners, is dependent upon those operating it. Only negative results can be expected when they are lacking in either capacity, necessary experience, or fidelity to its interests.

Much of the capital invested in railway enterprises owes whatever return it makes, to the shrewd management and conservative action of the experienced officers entrusted with its affairs.

On the other hand, it has not unfrequently happened in the past, that a railway property admirably located and promising abundant return to its originators and owners, has been weakened and its profitableness destroyed by those responsible for its management. It is not enough that those who direct the management of our roads should be loyal to the companies employing them. They must be experienced in all the appliances of the business, awake to all its opportunities, and familiar with all its traditions. They must not only know what instruments are felicitous for their use, but they must also be familiar with the instruments that have been tried by others and found impracticable or insufficient. When they do not possess this knowledge, we find the disbursement accounts swollen and disfigured in consequence of the use of obsolete or expensive appliances; in consequence of the neglect of the

management to adopt useful improvements as they are suggested; and, finally, in consequence of its efforts to introduce inventions and theories that have long been recognized as worthless by practical men.

And herein lies the usefulness of the associations and conventions of railway officials. These organizations help, however slightly, to educate the better class of men who belong to them, or who attend their proceedings. They assist this class to extricate themselves from the narrow rut of provincialism in which they are imbedded, and help them to regard their business from a wider and more intelligent point of view.

In business affairs every thing is said to be good or bad relatively. That is to say, a thing is good or it is bad, as it compares favorably or unfavorably with some other thing. This is so with railway disbursements. The expenses of a company may be large as compared with the expenses for a corresponding period a year ago, or five years ago, or they may be excessive as compared with the cost of operating some other road. We are hardly in a position to judge intelligently of the affairs of a company, and especially of its current expenses, without the aid of such comparisons. They afford us, generally, a test, although of variable value, by which to judge of the capacity of the managers, as well as the value of the property itself.

But in instituting these comparisons it is important that we should understand their full significance. If, for instance, we should discover that the percentage that the cost of operating a property bears to the earnings this year is greater than it was a year ago, it would remain with us to ascertain, before forming any conclusion in reference to it, whether the increase was attributable to the enhancement of prices, to necessary repairs and renewals put upon the property, to extravagant or incapable management, to an unavoidable falling off in business, or to a reduction in the price asked for doing that business. All of these things must be considered, and their influence accurately ascertained, before we can judge intelligently of the management of a property.

The proportion that the cost of operating bears to earnings may be said to rest quite as much with the traffic manager as with the superintendent, which latter officer is known to be immediately responsible for the expenditures.

The proportion that the cost of operating bears to the gross revenue is quite as dependent upon what is received for doing the business as it is upon the disbursements that are made for carrying it on. This fact seems not to be understood by many, and by others it is studiously ignored or its relevancy discredited.

It is possible for the traffic manager to so re-

duce the amount charged for conducting a business as to leave nothing whatever to divide among the owners or mortgagees. Many practical illustrations of this might be given, if necessary, to prove its truthfulness. The advantages that our most judiciously located roads possess, taking them singly or collectively, may be so frittered away by injudicious concessions as to barely pay the cost of working them: these results, whenever they transpire, are not, however, to be attributed to any single man or particular period of time. Many decades mark their progress and they represent the aggregate incapacity of many men; their want of experience; their indifference (unconscious though it be) to the interests of the proprietors; their want of reliability in their intercourse with each other as representatives of conflicting interests; their petty jealousies; their love of exercising arbitrary power; their employment of unnecessary and irresponsible agents; their belief in their superior capacity and shrewdness; their inability to harmonize the claims of conflicting interests or to co-operate heartily with their neighbors in the execution of just and necessary plans; and finally, in the case of those identified with the great properties, in their inability to see that as the representatives of the stronger and better located companies they have the power at any time to unite and crush out or keep in check the destructive propensities of the specula-

tive and irresponsible organizations that environ them.

For a long series of years we have been the interested spectators of an uninterrupted and marked decline in the rates asked for handling and transporting the traffic of railroads. This decline has more than kept pace with the new or increased traffic that has sought accommodations, and, in the majority of instances, has greatly exceeded the fall in the price of other commodities, notably the material and labor which the railway companies consume in the conduct of their business.

Where will this retrogression end?

What will be its ultimate effect upon the business interested?

What will be its effect upon the body politic?

Will it be possible under our peculiar form of government, so often a prey to ignorance and demagoguery, to increase our traffic rates in sympathy with any marked enhancement there may be in other values?

Let us hope so. Let us believe that in the majority of cases at least it will be found practicable and expedient to increase the rates when those in force are no longer remunerative. This process, however, we may believe, will not be consummated without irritation and loss of prestige to the railway companies and in many cases the prejudices of the community and the statutory

enactments of the State will prevent even a nominal restoration of the rates that were formerly charged.

The reduction of the rates charged by the railway companies has up to this time been attended with a steady increase in the volume of business, and to this increase, and not to any corresponding decrease in the cost of supplies or labor, the companies that still preserve their credit or afford profit to their owners are indebted for their escape. Without this increase those that still survive would long ago have suffered the fate of other enterprises less fortunate in this respect than they. Fortunately for them, however, they have been able to enlarge their business and, more fortunately still, much of the revenue that has been derived from this increased business has not occasioned a proportionate outlay of money.

The increase in the volume of the traffic of a road, as we have explained in a preceding chapter, is not attended, in the majority of instances by a proportionate increase in the cost of operating; any increase of business up to a certain point is characterised by great relative economy of operation; but when the point has been reached with a railroad, where the relative expense, as compared with the increase of the business, is no longer favorable to the former, then under the policy of reducing rates which we have been pur-

suing, a collapse will be inevitable and overwhelming.

When the volume of traffic can no longer be increased upon a line, or when the maximum capacity of the company operating it has been reached, then there can be but one result, and that an unfortunate one, if it then inaugurates or continues a policy of reducing its rates.

CHAPTER XXI.

Personality of Railway Management—The Cost of Operating Affected by the Extent of a Property —An Extensive Property Requires Fewer Engines and Cars, relatively, than a more Contracted One — A Great Company able to Exercise a Favorable Influence over its Contemporaries, and to Secure Advantages denied to Smaller Enterprises — Difficulties that Surround the Management of a Large Property — The Extent of Territory to be Watched — The Constant Change of Circumstances — The Golden Moment for Action, in many cases, Passes Unnoticed — The Excessive Duties Resting on the Manager — The Necessity that the Manager has for Depending on Subordinates, etc. etc.— What the Manager of a Great Property Expects to do; What he Does — He Lacks Ubiquity, Diffusiveness. The Niceties of Discipline — Difference in the Executive Capacity of Officers — The Danger that Arises from Undue Haste — Independence of Action upon the part of Subordinates Necessary upon Large Roads — The Consequences that Sometimes Follow — The Essential Difference between a General Officer and his Subordinates — The Exaggeration of Limited Responsibility — A Local Operating Officer Likely to Gauge his Expenditures by his Private Judgment of the Needs of the Property instead of by its Relative Wants — Extravagant Outlays on Particular Divisions the Consequence — Disbursements Should be Made to Depend on the Revenue Earned. The Remedy for the Evils that beset the Operations of a Large Property.

I have heard it said by critical observers of our system of railway management that quite a

number of our large properties while having outwardly the semblance of a well matured and impersonal organization, were in reality dependent upon the technical skill, and (consequently) life of a particular man, who in each case had adroitly usurped all the power and prerogatives of his associates in the business; that there was really no division of knowledge or authority upon such lines; that all the stalwart sentinels with their glistening armor and air of deep responsibility that were to be seen standing solemnly upon the ramparts of such properties were really only men in buckram, figures in wood, automatons, puppets, so to speak, designed by their maker to keep up the illusion of a well guarded fort for the purpose of frightening away meddlesome intruders, and quieting the fears of apprehensive and timid bond and shareholders. That many of our large properties were so organized that the value of their securities, (unknown to the owners thereof,) depended to an unnecessary and alarming extent upon the life of particular men hired to work them; that no provision whatever was made for the death or removal of these agents; That in some instances the property, through the crafty manipulation of the interested and ambitious servant in charge, had become practically a perquisite in his hands, to be used to reward favorites and to crush out all who refused to make personal subserviency a condition of their

office; that in connection with properties thus organized Men were not to be found; that in such an atmosphere only trembling sycophants and time servers found life endurable or possible; that in connection with such organizations, while the officers draw their salaries as upon lines more intelligently organized, they never really perform any duties commensurate therewith; that while these officers receive a measure of esteem from the public, as the titled representatives of the companies employing them, no one conversant with their real status ever seriously consults with them, or professes any respect for the offices they hold. And finally, that in connection with such organizations only the "Boss" exercises any real authority or discretion; the highest and the lowest, the Chairman and the truckman, all alike bowing to his will and awaiting obsequiously upon his pleasure.

Criticisms such as these are greatly exaggerated, I feel fully convinced, but even if true they do not apply exclusively to railroads; peculiarities such as we have described are to be found in all classes of business, and in every field where personal government finds lodgment. In this instance they relate to a particular aspect of the subject of the management of railways, that I have neither the ability nor inclination to consider, and while the baneful effect that they exercise upon large properties is, no doubt, much greater than

in those cases where the interests of a property are smaller and more easily considered, still they do not, it seems to me, belong essentially to the particular aspect of the problem that we started out to consider in this chapter, namely, the cost of operating as affected by the extent of a property.

Taking up the subject then in its more inviting if not more practical shape, it is undoubtedly true that the extent of a railway company's property has a direct and material influence upon the comparative cost of operating it.

In considering the relative economy of working railroads we discover that an extended property has advantages of an important character over those more contracted in their operations.

Such an enterprise requires a less number of engines and cars relatively, and these engines and cars are occupied to greater advantage, and are susceptible of more continuous, and, therefore, more profitable employment. The widely diverging traffic interests that such a company usually represents will not seek accommodation of it at the same time, and it will, consequently, be enabled to transfer its equipment from place to place upon its different divisions and branches as the exigencies of business occur, and thus it will be able to accomplish greater results at a less outlay than the company that can not find this profitable use for its rolling stock except at intermittent periods of the year. Where a property is ex-

tremely contracted the relative cost is still more marked. Upon such a line neither the equipment or the force it employs can be fully utilized.

Aside from the ascertainable savings affected by a concentration of interest under one management a great company is able to exercise an influence over its contemporaries in the interest of peace and equitable receipts that is not possible under other circumstances. This influence enables it to secure from its rivals a fair share of the business of competing points and an equitable division of the revenue arising therefrom. It also enables it to secure a multiplicity of other advantages of a like character highly beneficial to it, and not always within the power of enterprises of less scope and circumstance.

Aside, however, from these and similar important and valuable benefits that attach to a great property, the prospect of an economical management of the affairs of a railway company may be said to decrease in the ratio that its property increases.

The same difficulty, it may be said, that is experienced in guarding an extended frontier, or military line in time of war, is experienced by a management in watching the receipts and expenditures and other interests of a long line of railroad.

While the attention of the management of a great line is personally concerned in strengthening

some weak point in the system, disaster more or less serious will threaten the company at other places. The extent of territory to be watched, and the multiplicity of duties that devolve upon such an organization, render it difficult; if not impossible, for it to keep itself advised of the changing circumstances of business at the time they occur.

An understanding or arrangement perfected and set in motion upon such a road to-day will very likely need revision to-morrow or the day following, but in the multiplicity of affairs the exigency passes, or it slumbers on indefinitely, until the attention of the management is called to the omission, and it finds leisure and inclination to give the matter the attention it requires.

No one save the responsible management of a great corporation appreciates the significance of many of its undertakings, or their relative value or effect on the company's interests. No one else, consequently, can appreciate the injury it suffers in consequence of any neglect of its officers to promptly re-adjust its affairs from time to time, to meet the changes that are constantly occurring around it and in immediate association with it. Besides, it can not be expected that subordinates will be quick to discover omissions of this character, or precipitous in thrusting them upon the attention of their superiors after they do discover them:

Where the duties of a management are of so

delicate and laborious a character as to render it practically inaccessible, much of the time, to those who seek its presence, as must ultimately be the case upon a great railroad, the probability of its attention being called to its errors and omissions by subordinate operatives becomes exceedingly small indeed :

Beside this, the subordinate is well aware that the road to favor and advancement are not to be found in that direction; his instincts and his observation alike teach him to report only that which is agreeable to his chief if he would win or permanently retain his favor.

Upon a great and extended line the manager labors under the fatal disadvantage of not being ubiquitous; of not being able to be in several places or think of widely different things at the same time, and of not being able to solve complicated questions without the trouble of study and thought.

Gifted with superabundant energy and clearness of perception, this man, the manager of a great enterprise, envelops the property with the projects that team in countless profusion in his busy mind. But unfortunately for him, and more unfortunately still for the proprietor, he is unable to exercise, except in rare instances, that personal supervision over his projects, so necessary to secure from them the benefits that are contemplated. Able, ambitious, indefatigable, faithful

to his trust, he begins his career by attempting to do every thing, and he will end by doing nothing. Compelled, although much against his will, to act through others, he becomes finally the slave of his dependants. He discovers, as he progresses in knowledge of men and affairs, that by trusting too much to the judgment of his subordinates, he impairs, if he does not wholly destroy the unity of the organization so dear to him: while on the other hand, if he indulges in unjust or unwise acts of personal vigilance and assumption, he will undermine their personal efficiency by destroying their interest and pride in the enterprise. In either case the effect is to impair the usefulness of the management, and render the result of its operations less satisfactory to the owners than it otherwise would be.

As we have already explained, a company doing a business sufficient to keep the minimum equipment and force fully occupied, can be worked more economically than a company whose traffic is lighter or not so evenly distributed. In the same way, a road crowded to its utmost capacity with business, can be worked for less, relatively, than a road that is called upon to exert only its minimum strength. The relative amount of business that can be done, and what it will cost in either of the cases mentioned, will depend quite as much upon the extent of the property as upon the ability of the officers in charge.

Men differ widely as to their ability to make others work. One railway officer will receive the maximum service of which men are capable. Another will be able to impress only such subordinates as may labor in his immediate presence, and still another, personally capable and faithful, we will discover surrounded by incompetent, dull, and heavy-witted operatives, who render to their employer only an indolent support at best.*

It is manifest that only the first named officer has the capacity to manage. He alone possesses the approximate ability essential to the control of a great property, and when we consider, as we must, the vast interests that are centered in a great railway, and the multiplicity of incidents that accompany it and upon which it is dependent for much of the value it possesses, we feel that his ability, no matter how exalted, is so circumscribed and confined as to be utterly insufficient for the needs of such an enterprise. We are describing here a great man, a man of superb ability and presence. But what of the other two that we have mentioned, the men who know how to work themselves, but are incapable of extracting work from others? Manifestly they are only fit to

*One of the clearest headed, best informed, and most reliable men, personally, that I ever knew, when put at the head of a department, never succeeded in organizing his own immediate office force; the clerks performed desultory service from day to day as he personally directed at the time: when he was absent they gathered in clusters and discussed the weather, or made pretence of business at their desks. The head was not lacking in intelligence and perception, but he seemed to be totally devoid of executive ability.

fill subordinate positions, if the various offices in the organization are to be efficiently directed and controlled. But this is only our estimate of their usefulness, it must be remembered. Their own estimate is higher. They do not recognize any of the differences we describe; hence we find them everywhere occupying positions of the greatest responsibility, or actively aspiring to such positions. Perhaps, however, they are not, as we believe, unconscious of their incapacity to direct or command men; but, while fully aware of their weakness in this regard, it is possible that they imagine that possession by them of other elements of character fully compensates for their deficiencies in the particular field we refer to. If so, they err grievously in their estimate of the relative value of certain qualities in railway managers. The unfortunate class of incompetents that we have been attempting to characterize are the bane of every enterprise; they are the men connected with our railroads who render the sagacity of investors of no avail; who tear down the fair edifices erected by others more gifted than they; who fritter away properties that might, in better hands, prove both profitable and enduring. When such men are placed in charge of a great railway company, or any of its superior departments, we may trace beforehand the length of time it will exist, and the extent of its returns to its owners.

To secure the highest attainable results of

which a management is capable, a road should be large enough to occupy the maximum attention of at least the minimum number of officials essential to enterprises of that character. Under such a system the responsibilities of the deputy are merely nominal.

Upon an extended or overworked line the multiplicity of details that demand the unceasing attention of the directing head is so much beyond the capacity of a single mind that much of the work that is done, if the organization of the company is lacking in comprehensiveness, is necessarily carried on without adequate preparation or consultation; matters of great consequence are decided at a glance, and haste usurps the place of deliberation. With such an organization independence of action upon the part of subordinate officers is necessary and inevitable in many cases: this independence grows with its exercise and the occasion that gives it opportunity and utility; with the lapse of time, isolated action on the part of these subordinate agents becomes the predominating characteristic of the management. There is nothing criminal in this: the manager must trust to somebody, and he prefers to trust those that he himself appoints rather than to see spring up about him general and coördinate interests in the management equal in permanency to his own, if not in the extent of the discretion they exercise;

knowing his subordinates to be actuated by the same desire to serve their employer honorably and faithfully that he himself experiences, he relinquishes to them that portion of his power and prerogative that he can not personally exercise.

This is very well in many respects, but there is always this important difference between a general officer and his subordinate, and the effect of their actions upon the property concerned. The former looks at the enterprise from an elevated view. He scans the property as a whole and the relation that each part bears to the whole. He sees at a glance what is important and what is unimportant; where the resources of the company should be used to secure the best results for the owners; where they may be safely omitted. The subordinate or local officer has, on the contrary, but an imperfect view, at best, of the part entrusted to his care. This isolated fragment grows, however, in magnitude and importance as he fondles it and ponders over it, until in time he comes to attach an absurd and distorted value to it, out of all proportion to its real worth. Hence, when allowed to act independently, he is governed, not by the relative value and usefulness of the property as a whole, but by what, from his restricted point of view, he esteems best for that portion of it which is immediately entrusted to him; having determined what is best, his dogmatism in carrying out his views is frequently as conspicu-

ous and as unreasoning as his ignorance of the wants of the enterprise is manifest.

Immersed in the duties of his limited sphere, the local officer, who exercises general powers, soon ceases to have any regard whatever for collateral interests, and if we follow him attentively from day to day we shall discover (if he is connected with the operating department of a company) that his improvements and extensions of the property entrusted to him are not governed by what it earns or what it is expected to earn in the future, but, on the contrary, by his judgment as an expert of what is necessary to make it a road of the first class; he holds all other interests subordinate to this. A like extravagance will be noticeable in the current operations of the line under his charge; thus he will operate an isolated and unproductive division of a great property from year to year with a full equipment of passenger and freight trains regardless of the revenue they severally bring to the company. The deficit in the finances of a company that such a course involves must be made good, it is obvious, by more productive portions of the property. To the directors and owners the affairs of a division thus managed (when known by them) seem hopeless; they look upon such property, however, as perhaps accomplishing a negative good, although destitute of value within itself; they are therefore prepared to look

upon the most monstrous evidences of mismanagement as evinced in its affairs as something to be expected and for which no one can possibly be to blame.

This is one of the unfortunate results that must be expected to follow in the majority of cases where local officials of a company are encouraged or permitted to exercise the prerogatives of general officers.

Another fruitful cause of the unsatisfactory results to the owners that attend the operation of many poor properties, such as I have been describing, lie in the fact that the men in charge of them are unable to give them proper attention. Enterprises of this description I have noticed when owned by great corporations are usually worked in common with properties of a more productive character; in other words, they are attached as appendages to the duties of officials already overworked. The result of this overwork is that the officials subjected to it lose the ability to operate cheaply; no longer able to give adequate attention to the small details of business, they quickly learn to despise them, and, as these small things constitute the difference between profit and loss in the operation of such roads as we are describing, the result is, of course, the latter. The opportunities of office make the managers of our great railway enterprises giants in intellectual power; they crave the exercise of duties worthy of their

superabundant ability: petty details become distasteful to them. Such a result is inevitable.

Now attention to detail is just what the properties we have been describing require; absence of it is fatal to their profitableness. Many of the lean and hungry divisions and branches of our great roads might be made productive of profit to the owners if operated as distinct enterprises under the immediate eye of such owners: this would secure for them minute and searching attention. The necessities of the situation would compel economy, rigid and pinching; these necessities would suggest the avenues leading up to their attainment; more thought would be paid to the net income of the property and we should hear less said about its "policy." In those cases where the traffic did not warrant a passenger train separately from a goods train it would not be operated separately; mixed trains would be the rule upon such a line: these mixed trains would be operated at the minimum rate of speed, we may be sure: this would lessen the cost of keeping the machinery and equipment in order and the wear and tear of the track would be diminished: A comparatively light and inexpensive track would accommodate a business thus conducted; the equipment would be simple and void of ornamentation; the wages paid would be in accord with the revenue earned by the property: All these things would be inevitable

and they would result in a corresponding saving of men and material: They would also result in a change of management. The man fond of little affairs and petty details and makeshifts, though possessed of ability, withal, would at once, under such a state of affairs, take the place in the management of his brother of greater ability but less efficiency.

Expenditures that seem absurd and unjustifiable in connection with a small or poor property, operated as a distinct enterprise, seem necessary and justifiable in connection with such an enterprise when worked in connection with other property, the income from which justifies such expenditures. Hence the secret of the unprofitableness that marks the operations of poor railways of the character we have described.

It is the desire of every railway officer to see the property entrusted to him grow until it absorbs everything connected with it or contiguous to it.

He also desires to see it maintained at the highest attainable point of efficiency. Whether this last mentioned desire is wholly laudable or not depends upon the receipts of the property.

The amount expended in perfecting a property over and above the amount necessary to preserve it, should depend wholly upon its revenue, present or prospective: the outlay should cease at that point where the money invested will not earn a

fair return: when the expenditure extends beyond such point it is dictated by an over nice conservatism or by a sentimentalism, more or less maudlin in character.

It is lacking in either wholesome honesty or good sense.

The owner of money advances it supposing that he is to receive a stipulated sum in return, either directly or in the future; this return is called interest; when, therefore, money is used, either with or without the consent of the owner, except upon a reasonably well grounded expectation that it will earn a fair return, gross injustice has been done him. He has, in fact, been robbed. The exception to this rule is where it is necessary to expend money without hope of return to protect that which has already been invested.

The remedy, so far as a remedy is possible, for the defects of management, which we have pointed out as inherent in all greatly extended railway enterprises, depend, in the first place, upon a wise selection of officers and operatives, and afterwards upon a careful and sufficient subdivision of the duties of those entrusted with the general direction of the property. The corps of managing officers thus organized should act under the immediate direction of the board of directors or its principal representative or manager. By thus methodically classifying the duties and dividing them arbitrarily among the general officers (after

having carefully provided each with one or more assistants or substitutes, as suggested in a preceding chapter) an organization would lose its personality; and particular men, or classes of officers, would no longer be indispensable to a company.

The rules and regulations governing the United States army form, I am inclined to think, in many respects, perhaps, the best description of organization, generally speaking, that could be devised for the government of the force of a great railway company; under such a system each individual member of the organization would be held in place by well understood rules and regulations and he would at the same time have certain responsibilities that could not be neglected without punishment and certain rights that could not be infringed without the operation of certain just and necessary formalities:

It is only under an impersonal organization of this description that it is possible to give a great property the minute attention it requires or secure the intelligence of action necessary to its highest perfection.

CHAPTER XXII.

Relative Expenses — The Cost to a Company of Transporting its Material, Fuel and Operatives over its own Line — The Variableness of this Expense upon Different Lines — The more Important Supplies that require Transportation — The Quantity Dependent upon Quality and Durability — Shall a Company Increase its Earnings by Charging for the Transportation of its own Supplies and Men? — The Adoption of the Practice by the Commissioners of an Eastern State, and by certain Railway Companies; The Effect of the Practice on both Earnings and Expenditures, and also on the Assets of a Company; The Credit to Earnings and the Charge to Operating Expenses not Simultaneous; Effect on the Commercial Statistics of Railroads; The Average Rate per Ton per Mile Greatly Lessened — Necessity that the Earnings of a Company from the Carriage of its Supplies and Operatives, also the Tonnage of the Supplies and the Number of the Operatives Transported shall be Shown Separately in the Accounts and Returns — The Practice of Charging for their Transportation will Add Greatly to the Cost of Accounting —A Fixed Rate should not be Charged for all Classes as Directed in Massachusetts — No Exception Should be Made for any Class of Supplies if a Charge is to be Made — The Percentage of Operating Expenses to Earnings Distorted by the Practice — If it is Right to Charge for Supplies it is Right to charge for the Transportation of Employes — The Pernicious Effect of Introducing Fictitious Elements of this kind into a Company's Accounts — The Ludicrous Aspect of the Case — If Earnings are to be Increased by Charging for Material

and Men the Revenue of Railroads will be Dependent upon the Celerity with which a Management can Move its Supplies and Operatives — When the Gross Receipts of a Company form the Basis of Taxation should the Earnings on its own Supplies and Men be Taxed? — The Propriety of Charging for Transportation of Men and Material Employed in Construction Work.

The great bulk of the supplies used by a railroad company must be transported by it for a greater or less distance over its own line. Very little, if any, of the material of a bulky character used by it is delivered at the exact point where it is required for consumption.

The number of miles the supplies will have to be hauled will depend upon the distance from the point of delivery to the company to the place where finally used. The average haul will never be the same upon any two lines, and the relative expense of doing the work will consequently never be the same. The character of a country in which a line is operated governs the place of purchase; one company, to illustrate, will be able to buy ties in the immediate neighborhood where they are needed, while upon another line they will be purchased at a distance; one company will have its rails manufactured midway of its road, while another company will be compelled to transport them from the terminal point of its line; upon one line fuel will be located conveniently for use, while upon another line it will

have to be moved a much greater distance to reach the distributing points; one company will be able to buy the lumber and heavy timber it requires without going off from its own line, while another enterprise will be compelled to seek supplies of this character at a distance upon other roads.

A difference in the quantity of material used or the distance it is hauled affects favorably or otherwise the cost of operating.

The supplies of greatest importance and bulk that must be transported for varying distances to the place where finally required in the operation of a road, are ballast, track rails, spikes, ties, material for bridges, buildings, fences, and machinery, the necessary rolling stock and the furniture and fixtures needed at stations and elsewhere.

The quantity of material transported will depend upon its durability. This in turn will depend upon its quality, the use to which it is subjected, and the care that is taken of it. Iron of poor quality will require to be renewed more often than good iron, and a track subjected to the wear and tear of a heavy business must be renewed earlier than a track not subjected to such a strain. It thus appears that the quantity of business a company does affects the amount of the supplies it transports for its own use.

The length of time that material will last will also depend, in a measure, upon the climate and

the nature of the soil where it is used. Thus the cross ties or wood work of a road will not last so long in a hot climate as in a cold climate; and cross ties that are embedded in a damp soil will require to be renewed more frequently than when embedded in sand or gravel. The more frequently this renewal takes place, it is obvious, the greater the quantity of supplies that the company interested will have to transport.

The interest naturally attached by us to this ever varying service which the railway companies are compelled to perform for purposes of their own, and at such great expense, is heightened by the practice of certain companies of increasing their so-called earnings by charges for work of this kind.

We do not know where or with whom the practice first originated. We know, however, that while the custom is not general it prevails upon widely separated roads, and that its advocates are sufficiently high in authority to have secured its adoption and incorporation into the regulation of the affairs of many important and well managed lines.* Thus the very conservative Railway Commissioners of Massachusetts, an authority to which we notice the Railway Commissioners of other States defer in many things

*"It is not the general custom for a road to charge freight over its own lines upon material or fuel which is to be used in operating the road, though occasionally one comes across a road that does this. I think, however, that the principle is wrong." *Letter from General Auditor, Mr. John P. Whitehead.*

connected with the affairs of railroad companies, direct that

"All fuel, material (except gravel,) and supplies hauled for company's use should be credited to freight earnings at fourth class rates, charged to the proper accounts, and included in the freight tonnage."*

A practice having the encouragement and direction of men so high in office, and fraught, as this is, with such great importance to the railway companies, is worthy of careful consideration; we can, however, notice only its more salient features here.

The practical effect, in the first place, of the custom, as every one can see, is to enormously increase the earnings account of railroads, and to enhance, nominally, the price of every species of material (except, in the case of Massachusetts, gravel) used by them.

The rate that is charged for transporting is incorporated at once with the ordinary freight receipts of the line, and added to the original cost of the supplies on hand.

When the material is finally used, the first cost, with the local earnings added, is charged to whatever account the material is expended upon, but until the material is actually used, the earnings upon it, with the first cost, appear in the accounts as an asset:

*Eighth Annual Report of Board of Railroad Commissioners, Mass., p. 87.

So that the first effect of a company's charging for the transportation of its own material, is to swell its apparent income, and at the same time increase its assets by the amount of the local earnings on such material.

Eventually the Operating Expense and other disbursement accounts will of course be charged with such local earnings, and thus the gain to Income is set off by a counter-charge, but the charge, unfortunately, does not appear in the accounts simultaneously with the gain. On the contrary, it appears temporarily as a valuable asset, and as a company must always keep on hand a large quantity of material, it follows that its assets will be permanently enhanced by the amount of the accumulated earnings on its own traffic. The assets of a company will thus depend upon the amount of supplies it keeps in store and the distance they have been hauled and the rate that has been charged by the owner for such service.

If the earnings of a company are increased by the addition of the charges on its own traffic, it is of course necessary to swell the tonnage by the accumulated weight of such traffic. The effect of this is, apparently, to greatly magnify the commercial operations of a road. But (in the case of Massachusetts, noticed above,) as the rate at which the material is carried is fixed arbitrarily at a very low price, it lessens in the accounts and

returns the average rate which a company apparently receives for doing its business, and thus serves to mislead the student in his examination of the published accounts of the railroad companies.

If the practice of charging for the transportation of material were followed universally, it would be a well understood factor in the affairs of railroads, and the harm would be lessened somewhat, perhaps, but until the system is adopted upon every road it would seem to be only just to investors and the public that those companies having what we may call an Operating Traffic Account should state the amount of such traffic earnings, and the tonnage upon which it is based, specifically in their books and returns. And we are not sure that such a separation of the accounts would not be well in any event, even if the practice of charging for the transportation of supplies should become universal.

Other objectionable features of a very serious character connected with the practice of charging for transporting the material of a railway company suggest themselves.

The opening of an Operating Traffic Account will add greatly to the cost of accounting: it will increase the bulk and add greatly to the labor.

The details will be magnified indefinitely. Thus the material must first be weighed, a bill

made, and the charges duly extended thereon. When the material reaches its destination, the charges will not be paid to station agents in cash, as is the case with ordinary commercial business, and so end there. No. Before the accounts of the agents can be relieved of the burden of these myriad operating charges, each transaction and item must be formally examined by the proper accounting officers, and specific vouchers must be duly certified and approved and passed through the books of the different departments. Further than this, the earnings upon each item of material must be carefully and systematically followed up and recorded by the accountant at headquarters, and by the clerks at the various shops, store-houses, and depots of supplies, so that the charge may be disposed of when the material it affects is finally consumed, and not before.

All this involves infinite minutiæ. It increases the force, and thereby increases the expense of doing business. The machinery required to perform the labor effectually, must be both elaborate and costly. Any neglect to perform the work thoroughly and systematically, can not but result to the company interested in grave irregularities and loss of *esprit*.

Still other objections to the system suggest themselves. If the practice is to be incorporated in our railway system, it is clear that a fixed rate should not be charged for all classes of material.

We know that the cost of handling and transporting warehouse trucks, wheel-barrows, office chairs, ticket cases, glass, and kindred articles is much greater per hundred weight, than for fuel, iron rails, ties, and pig metal. The work is also much greater. The rate charged should consequently be higher. Clearly the charge, if any charge is to be made by a company for transporting its own supplies, should be based upon the ordinary traffic tariffs in use.

These tariffs are the product of men skilled in all the varying phases which the subject of transportation presents. Although crude in many respects, they exhibit infinite skill and are the result of many years of acute observation and thought. While the transportation problem is a science which is but imperfectly understood, and still more imperfectly expressed, still we are sufficiently versed in its mysteries to know that an arbitrary rate for all classes of business, without reference to the cost engendered, can not be accepted as satisfactory. Such a disposition of the question would not be creditable, no matter under what circumstances it might be applied.

Again, if it is right to charge for the wood, coal, stone, ties, iron, fencing, and other material of a railroad company, why should gravel or ballast be excepted, as required by the Massachusetts regulations? Ballast is an indispensable article in railway economy, and one of the

most important. It is as much a necessity as fuel, the rail upon which the cars move, or the ties that render it possible to preserve a uniform track. Surely so important an addition to the Operating Traffic Account should not be thrust aside in such a manner. We can not leave this subject without submiting the propriety of this discrimination to the further consideration of the advocates of an Operating Traffic Account.

A charge for material and gravel at fourth class rates would double, nay quadruple, the earnings of many important lines.

But whatever the increase of the Earnings account may be from the practice of charging for the transportation of material, the apparent gain would be more than counterbalanced by the increase of the Expense account over and above the amount of the so called earnings, as the cost of accounting, which the system involves, as we have explained above, would have to be added. The practice would also have the effect to destroy the relation which the operating expenses naturally bear to the earnings. Upon all supplies transported the operating expense would be the same as the gross earnings accruing from that source, or one hundred per centum.*

*"Unlike other operating expenses which vary all the time in proportion to the earnings with which such expenses are connected, a charge for transporting a company's supplies would permanently and always amount to 100 per cent on the corresponding amount included in the earnings, and the effect would be to raise the total per centage of the operating expenses, as a whole, to the total earnings. The extent of such advance

Instead of discovering an advantage from the adoption of the system of charging freight on a company's supplies, we discover therefore a positive loss, equal in amount, at least, to the cost of accounting, and the expenses incident thereto.

The subject is prolific of suggestions. If it is right for a company to charge for transporting material intended for its own use, then it seems to me clearly to follow that it is right for it to charge for the carriage of every employe it transports. It would not only be right but necessary and proper that it should do so. I do not see how this conclusion can be questioned. The employe manipulates the supplies and renders them available; without his services they would be valueless. Hence the principles of accounting applicable to them apply equally to him.

The suggested charge for transporting material is made, it is presumed, primarily for the purpose of ascertaining the approximate cost of such material at the point where it is used, and, per consequence, the cost of the work upon which it is expended.

But why stop with material? To make the information of value we must also know the cost of transporting the operatives. We can not make comparisons otherwise, and without it the system would be incomplete and fragmentary.

Without this information we are only partially

would of course depend upon the extent to which the expenses were increased by including such freight." *Communication of General Auditor John P. Whitehead, Esq.*

enlightened; we must know all the facts, otherwise the system falls to the ground. We must know, for instance, the cost of the manager's tour of examination, and each item of work must be charged with the thought he devotes to it; we must know the cost of transferring employes from one part of the line to another; the peregrinations of inspectors, auditors, trackmasters, and the myriad of officials, agents, and others that swarm upon the line in pursuit of their daily business. The passenger earnings must be increased by charging for the transportation of all these people at ordinary traffic rates. It may be said, indeed, by the shallow-minded, that a company is put to no great expense on account of this service, as no additional cars are hauled to afford it accommodation: but this is a superficial view of the subject, and utterly unworthy our serious attention.

The earnings from the transportation of employes would, it is apparent, greatly increase and round out the lean proportions of the passenger receipts, and the information would prove quite as valuable in ascertaining the cost of the various departments and branches of railway service as the ascertainment of the cost of moving the supplies of a company.

The cost of keeping accurate and trustworthy accounts of the movements of operatives and the debits and credits resulting therefrom would, to

be sure, add greatly to the expense of a railway company, but not greater, relatively, than the cost of keeping accurate account of the receipts from material carried. Upon many lines the work of keeping these accounts would be sufficient to merit the formation of a separate bureau of accounts. If consolidated with the business that would arise from the practice of making a charge for carrying railway supplies it would warrant the construction of a separate department. The nominal product of this department (its receipts and expenditures), would, we doubt not, outrank that of all others. But we may be certain that its expenditures would exceed its so-called receipts.

Under a system of charging for supplies and operatives transported the earnings of our roads would no longer rest upon the cash collections; they would depend upon the quality of a company's material, its durability, where it was purchased, the industry and enterprise exercised in moving its supplies from point to point, the number of its servants, and, finally, the celerity with which the latter traveled from place to place. It would only be necessary when times were dull and traffic receipts light, or when it was desirable for any purpose to exhibit large earnings, to load half a dozen or more trains with operatives or supplies and haul them such distance as might be

required to produce the desired effect or make up the amount of earnings needed.

We commend this phase of the subject to the consideration of companies owning uncompleted roads or roads running through unproductive districts of country. The subject also merits the attention of receivers acting under the order of our courts, who get for their services a per centage of the nominal income of the property they manage, or mismanage, as the case may be.

Aside from the cost engendered, the fictitious elements which the practice of charging for the transportation of supplies and operatives injects into the life of a railroad render it highly objectionable. The exhibits no longer convey a trustworthy account of the profitable traffic of a company; the per centage that its expenses bear to its earnings is greatly increased, and we are ever in doubt as to how much of the apparent prosperity is fictitious, how much real. Our examination of the returns of a railway company thus made would much resemble our examinations of the planet Jupiter; we should be forever striving to ascertain how much was solid, how much gaseous.

In many of the States the taxes levied upon the railroad companies are based upon the gross earnings of the latter. If the companies charge for the transportation of their own supplies and men would they be compelled to pay a tax upon the

amount of the revenue credited as accruing from this source, or would they go through their accounts item by item and carefully eliminate such charges before making their returns? Clearly the latter process would be attended with considerable expense and would be likely to overlook many items that ought properly to be deducted; However, the policy of paying a tax upon fictitious earnings would, we know, be still more objectionable to the railroad companies than the expense and inconveniences (with the resulting inaccuracies) of eliminating such earnings from the returns upon which their taxes are based.

In this connection a curious enquiry suggests itself. After the Massachusetts Railroad Commissioners, through their supervisor, had directed each railroad company in the State to include in its earnings a charge at fourth class rates on all material and fuel, save ballast, transported for its own use, their chairman* recommended that the taxes on railroads shall be based upon their earnings. The effect of this is, as already explained, to levy a tax on the so-called earnings of the companies derived from the transportation of their own material ;† or is it the intention of Mr. Adams to except the so-called earnings on rail-

*MR. CHARLES FRANCIS ADAMS, JR.—*Proceedings of National Conventions of Railroad Commissioners, p.* 18.

†This would increase enormously the taxes of the railroads, as at present levied, in Michigan, Wisconsin, Minnesota, wherever in fact the tax is based on gross earnings.

way supplies from the operations of the tax? If so, the exception, it seems to me, should clearly be recommended with the suggestion which he makes to alter the method of taxation.

I can not stop to enumerate in detail the number and serious character of the objections that present themselves to my mind in connection with the practice of compelling railroads to include in their earnings fictitious credits for supplies and operatives transported by them in connection with their ordinary works: I have said enough, however, I trust to cause those disposed to insist upon the adoption of the practice to pause and consider whether it is either politic or wise for them to ask the railroad companies to swell their accounts with hypothetical receipts and charges of this nature.

EARNINGS SHOULD BE CHARGED ON CONSTRUCTION MATERIAL.

The objections, however, that may be offered to the practice of charging for material and men transported in connection with the incidental operations of a company do not, I think, hold good in connection with its construction work.

In the prosecution of new lines and extensions, in the construction of new works, in the addition of equipment, and in such other improvements as come properly under the head of permanent expenditures, it is important that the whole cost should be ascertained. Hence it is not only

proper but right and necessary that construction should be charged for all material and men transported in connection with such work.

The operating expenses of a road are temporary and evanescent, but the construction account represents a permanent investment. Upon the total amount of this investment the owners are entitled to a reasonable return, no matter when or how, or for what purpose the amount was advanced; hence the necessity of the charge against this account being full and accurate.

Other reasons, not necessary to enumerate here suggest themselves why it is desirable that the exact cost of construction work should be accurately ascertained.

However, each company should be left free to act its own pleasure in this as in other matters of a similar nature. In view of all the facts surrounding the subject of an operating traffic account some of the more objectionable features of which I have pointed out, I would suggest the incorporation of a rule like the following in the regulations of all railway companies, in place of that submitted by our Massachusetts friends, to wit: The employes of a company and all material nd fuel owned by it, used in the ordinary operations of its road shall be carried without charge upon its books or in its accounts, but for all men and material transported by it for cons truction purposes a charge may, at its option, be made at the usual traffic rates.

CHAPTER XXIII.

Taxation of Railway Property — No Tax now Levied on Railroad Companies as such by the General Government— State Taxes never relatively the Same — The Basis Different in every State — Effect Upon Competing Railway Companies — Different Systems of Taxation Considered in Representative States — The Subject of Gross Earnings as a Basis of Taxation Considered — Its Principal Merits, Simplicity and Economy — Its Adoption by the National Committee of Railroad Commissioners — Draft of Law Recommended by the Committee — Objections to the Gross Earnings Tax — A Variable Percentage of Gross Earnings Tax is in the Nature of a Subsidy to Particular Roads — The Gross Earnings Tax too Simple; it Invites Oppression — The Opportunities it presents for Legislative Exactions and Class Legislation — A Gross Earnings Tax Increases the Burdens of a Road Doing an Unprofitable Business — Method Proposed by the Royal Commission of Great Britain — Advantages of Local Taxation — Objections to it — The Essence of Railway Property its Net Earnings — Net Earnings the True Basis of Taxation —The Belgian and English System Based on Net Earnings — Superiority of the Net Earnings as a Basis of Taxation — So long as the State Exercises the Right of Circumscribing the Earnings of Railroads it must Circumscribe in a Corresponding Degree the Taxes it Exacts — The Right of Sovereignty not Simply Restrictive: it must be Protective as well.

THE METHODS ENFORCED BY THE GENERAL GOVERNMENT.

So far as the general government is concerned no tax is levied by it upon the railroad companies

as such. The only general tax paid by them is a stamp tax on bank checks, and this tax is levied on all classes of people who have occasion to use bank checks, without reference to their business.

During the period of our civil war, and for some time subsequent thereto, taxes of a very onerous character were levied by the general government upon the railway companies; in other cases the companies were simply made the instruments for collecting the tax of the people.

One mode of taxation devised by the general government took the form of a tax of two and one-half per cent. on the gross receipts of railroads. By permission of the law this rate was added by the companies to the rates charged for doing the business:

Another form of taxation was a levy of three per cent. on the gross passenger earnings of the companies, but this tax, like that on gross receipts, the companies were permitted to add to their tariff rates:

Still another form exacted a tax of three per cent. on the interest paid on mortgage bonds* and on dividends distributed by the companies among their shareholders. This last mentioned tax was afterwards increased to five per cent.; in January,

*This tax on capital was usually in the case of mortgages deducted by the companies from the amount of the interest the holders of the bonds would otherwise have been entitled to receive. In the case of dividends it frequently happened that the amount of the government tax was deducted from the amount that would otherwise have been paid by the company; in other cases, however, the amount of the tax was paid by the company in addition to the dividends declared.

1872, however, it was reduced to two and one-half per cent. and on the 30th of June of the same year it was permitted to expire.

All of the taxes levied by the general government which we have enumerated were considered to be of an extraordinary nature, consequent upon the war, and they were one and all permitted to pass away with the occasion that gave them birth.

STATE DISCRIMINATION.

When we turn to the State governments we find that the taxes imposed upon railway companies are never relatively the same. The basis of taxation is different in every case, and the rate paid is consequently not the same. The method of assessment and levy is also different; each State pursuing a peculiar system, partly borrowed, partly its own.

To appreciate the importance to the railroad companies of the difference in the amount of the tax levied upon them, in different States, we must remember that the lines that separate these States possess absolutely no commercial significance whatever. It follows in consequence of this that the railroad companies operating under State regulations are more or less embarrassed by their operations.

The difference in the rate of taxation, as levied by different States, is so great as to influence, in some cases, the cost of doing business upon the

roads of contiguous and rival companies, separated by State lines, to the extent of two or three per centum of their gross earnings.*

To those familiar with the subject, it requires no difficult stretch of the imagination, to picture, under such a state of affairs, a trunk line between New York City and St. Louis or Chicago so taxed by the States and petty districts through which it passes as to afford a company pursuing a different route and not so heavily handicapped, a margin on its business equivalent to a fair profit on its investment:

This difference, if divided among the patrons of the latter enterprise (instead of among its owners), would offer an inducement to the public that the first named company could not meet without putting a strain upon its resources that would not be necessary with its rival.

This is discrimination in its most odious form.

When a State discriminates, as is sometimes the case, between railways within its own borders, exactly the same results are produced as between trunk lines located as above described; that is to say, the difference in the amount of the tax levied, when it affects rival lines, is a discrimination against one enterprise to the advantage of the other, and affords the one favored a margin equal to the amount of the discrimination, which margin

*Thus in Michigan the tax is two per cent. on roads earning less than $4,000 per mile, while in Wisconsin, across the border, the tax is four per cent. on all roads earning over $8,000 per mile.

it may use to the ruin of its adversary's traffic whenever and wherever they come in competition.

METHODS OF TAXATION IN A FEW REPRESENTATIVE STATES.

A description of the various systems under which taxes are assessed in the United States would occupy much more space than we can profitably give the subject here. But for the purpose of illustration, and only for that purpose, we may explain the systems which we find to be in force in six or seven different, and in many respects, representative States, namely, Wisconsin, Michigan, Minnesota, Iowa, Illinois, California, and Massachusetts.

TAXATION IN WISCONSIN.

Taking these in their order we find that in Wisconsin the tax on the property used in connection with the operation and maintenance of railroads is based on the gross earnings thereof. It is levied by the State and is payable in two equal annual instalments, in February and August of the year following that for which it is levied. Towns and cities are permitted to levy a special tax for the improvement of streets occupied by the railroad companies within their borders.* The

*"In cities and villages a certain class of improvements are made only from funds raised by a tax on the property benefited; these improvements include sidewalks, lamp posts, paving, opening and widening streets; in some cases sewers and occasionally water pipes. In these cases special assessments are made, and the amounts are confirmed by some court to which the assessment is submitted for revision." *Communication of Frank P. Crandon, Tax Commissioner, etc.*

general tax in Wisconsin is not relatively the same with all companies, but is based upon the annual gross earnings per mile of road, operated. When such earnings exceed three thousand dollars per mile of road the tax is four per centum of such gross earnings. When the earnings are over fifteen hundred dollars per mile and under three thousand dollars per mile the tax is two per centum of the gross earnings in excess of fifteen hundred dollars per mile and five dollars per mile of road. When the gross earnings are under fifteen hundred dollars per mile the tax is only five dollars per mile of road.*

TAXATION IN MICHIGAN.

In Michigan, as in Wisconsin, the tax is based on gross earnings. It is paid into the State treasury in July of the succeeding year. The rate of taxation is three per centum of the gross earnings of railroads, when such gross earnings exceed four thousand dollars per mile of road, and two per centum in other cases; the operation of this tax is to discriminate in favor of companies earning under four thousand dollars per mile at the rate

*According to the operation of the Wisconsin law the tax on a mile of road earning $5,000, is $200; on a mile of road earning $1,500, it is $5; and on a mile of road earning $500, it is also $5.

The decrease of percentage in favor of the road earning $1,500 per mile as compared with a road earning $5,000 per mile is 3 2-3 or 91 67-100 per cent. of the tax levied on the latter. On the other hand, the road earning $1,500 per mile has an advantage over the road earning $500 per mile of two-thirds of one per cent.; the tax being the same on both roads. On a road earning less than $500 per mile, the discrepancy would be relatively greater.

of one per centum of their gross earnings or fifty per centum of the amount of the tax they pay to the State. "There is also a tax (in Michigan) of three per cent. on receipts from passengers carried in any palace or sleeping cars, or any car for which an extra price is paid; and a tax of two per cent. on gross receipts derived from the leasing or hiring of cars by any 'special,' 'fast,' 'colored' or other freight line. * * * * The railroads incorporated before 1850 were subject to an annual tax of three-fourths of one per cent. on their capital stock and all loans used in construction. The Lake Shore and the Michigan Central are still taxed in this way."*

Lands owned by a company in Michigan, but not required in connection with the operation or maintenance of its road, are treated in all respects as if owned by private individuals.

TAXATION IN MINNESOTA.

In Minnesota the tax is also levied directly by the State, and is paid to the State treasurer in March of the following year. The rate of taxation here generally is based on gross earnings; but the practice is not uniform, as in Wisconsin and Michigan.

"The railroad companies in the State, organized under special charters, were required to pay into the State treasury in lieu of all other taxes,

*Report of Committee of Railroad Commissioners on the taxation of railroads.

one per cent. of their gross earnings for the first three years, two per cent. for the next seven years, and three per cent. thereafter. * * * The Chicago, Dubuque & Minnesota Railroad Company have declined to accept the provisions of the above law, and are consequently taxable in accordance with the general laws, as other property."*

TAXATION IN IOWA.

In Iowa the valuation of railroad property is fixed without the intervention of local assessors or agents, by a State board, consisting of the Governor, Secretary of State, the Auditor of the State, and the State Treasurer. The assessment is also made by this board. It is fixed arbitrarily at a certain amount per mile of road.†

The tax thus assessed by the general officers of the State and paid by the railroad companies to the local authorities along the line, includes real and personal property of every description peculiar to a railroad company, but does not prevent taxation for special improvements by cities and towns.‡

*Minnesota Railroad Commissioners' Report, 1873, p. 18.

†The amount of the tax thus assessed is apportioned by the board to the various taxing districts through which the line runs, upon the basis that the mileage of the road in such districts bears to the total mileage. Under this method of taxation the relative value of the property in the various taxing districts, it will be seen, does not affect the amount allowed them by the State board, the basis being the number of miles of main track.

‡In Iowa the holder of the securities of a railroad company located within the State is taxed on such securities the same as on other personal property, although the railroad upon which the securities he holds are based has already been taxed on its full value.

TAXATION IN ILLINOIS.

In Illinois the law is more complicated than in any of the States we have referred to; here taxes are based on the value of the property. The assessment is made partly by a State board of equalization (elected by the people) and partly by local authorities. The taxes are collected by the treasurers of the various counties interested. The value of the property belonging to the railroad companies in the various taxing districts, and coming within the cognizance of the State board, is certified to such board by the local authorities. The State board then fixes the value of the road upon which the assessment shall be made within the various counties. The railroad proper in Illinois is understood to include the right of way, the tracks, and other improvements thereon, including sidings and turnouts. The value of the rolling stock is determined by the State board and is apportioned to the local taxing districts on the basis that the mileage in such districts bears to the total mileage. The real and personal property owned by a company and not included in the assessment as determined by the State board, above referred to, such as wharves, shop grounds, supply depots, storage houses and the contents thereof, including furniture, tools, machinery and fuel, is assessed directly by the local authorities. And finally, if the funded debt of the company

and the market value of its shares exceed the value of the real and personal property assessed in the manner we have described, then the company interested is taxed for such excess. This latter may be called a capital tax.

TAXATION IN CALIFORNIA.

The method of taxation in California is described as follows:

"Under the new constitution the property to be taxed includes credits, bonds, stocks, dues, and franchises. A State board of equalization and county boards are provided for. The State board is to assess the franchises, road-way, road bed, rails and rolling stock of all railroads running through more than one county at their actual value, and apportion it to each county and municipality in proportion to the length of road therein. All other property is assessed in the place in which it is situated."*

TAXATION IN MASSACHUSETTS.

In Massachusetts the railroad companies are taxed on the basis of the market value of the capital shares on the first of May preceding the assessment. The rate is determined on the basis of the whole amount to be raised by property taxes in the State during the year. The railroads are also taxed locally, on the assessed valuation of

*Report of Committee of Railroad Commissioners on taxation of railroads.

real estate and machinery, but the amount of this latter is deducted from the franchise or capital stock tax described above.

In the seven States examined we have a tax on gross earnings, on real and personal property, and on capital.

The various methods here presented may be said to represent the different systems of taxation in this country. Let us examine them briefly:

TAXES BASED ON GROSS EARNINGS.

It will be noticed that in Wisconsin and Michigan, where the tax is based on gross earnings, the State discriminates sharply and severely against those enterprises that are likely to aggrandize it the most; the greater the amount of business a company does, whether local or inter-State, the greater the relative amount of tax it must pay.

And this brings us to the consideration of the subject of taxation of railroads as based on their gross earnings, a method of taxation having many enthusiastic and able advocates and admirers. The true secret of this interest, however, I am inclined to believe, is to be found largely in the simplicity and economy that characterize the workings of this particular system. It has no other recommendation that I am able to discover to the favor of those who seek an equitable basis of taxation.

The committee of railroad commissioners already referred to, consisting of Charles Francis Adams, Jr., W. B. Williams, and J. H. Oberly, however, strongly recommend gross earnings as the best attainable basis of taxation for railway companies that can be devised. This committee, composed of gentlemen of experience and ability, after giving the various methods of taxation pursued in the various States of the Union, and in Europe, attentive consideration, unanimously report in favor of basing the taxes upon the gross earnings and on the realty which the companies own outside of their right of way. The explanation of their method of taxation is as follows:

"The conclusion at which your committee arrived was that all the requisites of a sound system were found in taxes on real property and on gross receipts, and in no others — in fact, that when these were properly imposed, no other taxes would or could be necessary, as nothing would escape untaxed. Under this system, the real estate of the railroad corporations, held for corporate use outside of their right of way, would be locally assessed, exactly in the same way as the real estate of private persons or of other corporations adjoining it was assessed. There would be no distinction made in regard to it. It is the ordinary tax on real property. Beyond that a certain fixed per centage, established by law and of general application, should be assessed on the entire gross earnings of the corporations, and this should be in lieu of all forms of taxation on what is known as personal property. Under this system the rolling stock of the corporation would not be assessable; nor its securities, whether stock or bonds, either indirectly through the corporation or directly in the hands of

those owning them, The entire burden, be the same more or less, would be imposed in one lump on the corporation and levied directly. It does not need to be pointed out that this system is perfectly simple; that under it taxation is fixed by a general law and not by local valuations; that it is thoroughly proportionate, inasmuch as the amount levied depends on the volume of gross receipts; finally, it can be ascertained by any one, and can by no possibility be evaded."

Let us examine the method recommended by the committee and, as they have themselves pointed out its merit with great perspicuity and force, we may without impropriety or unfairness, confine our examination to the objectionable features of the proposed plan.

And in the first place we find that under the method of taxation which they advocate, all of the property outside of the right of way would be doubly taxed, for the reason that the earnings of a company are based primarily on the total cost of its property, and in fixing a tax on such earnings the levy would be made upon the aggregate value of the enterprise.

Any tax, therefore, that may be levied on the property of railroad companies, necessary to their business, outside of their right of way, will be supplemental to the tax on their gross earnings, and would come under the head of double taxation.

A tax on the gross earnings of the New York Central road, for instance, would be a tax on its realty and on its property of all kinds in New

York city. If such a tax was levied it would be apportioned, we will say, by the State officials, to the different taxing districts through which the road is operated on the basis of the mileage of road in such district; afterwards, according to the recommendation of the committee, the authorities of New York city would levy a tax upon the property of the company located in that place, outside of the company's right of way; the proceeds of this tax would belong to the municipality of New York, notwithstanding it had already derived its share of the tax levied by the State on the gross earnings, which earnings, as we have already stated, are based on the aggregate value of the property, and not on that portion only which lies within the right of way.

Besides this objection, which seems to me fatal, a system that permits a company to be taxed by the State and by the various districts through which it runs independently of each other, invites in its operation measures of the most objectionable and oppressive character.

The draft of the law recommended for adoption by the various States of the Union by the committee of railroad commissioners provides that every person, corporation or association owning or operating a railroad or any portion of one in a State shall, on or before a certain day in each year, pay into the State treasury a tax upon the gross receipts of such road. The rate is variable,

being dependent upon the amount earned; if the earnings exceed a certain amount per mile, to be fixed by law, then the company or person is to pay a certain rate; if the earnings do not exceed this amount then the per centum of taxation is to be different. This tax on gross earnings is to be in lieu of all other taxes, including that on property, capital and indebtedness, except on the realty of a company lying outside the location of its right of way. The realty lying outside the right of way (the width of such right of way being defined) is to be liable to taxation as if owned by private citizens. It further provides that when a road extends into two or more States the taxation accruing to each State shall be based on the relation that the mileage of the road in each State bears to the total mileage.

PROPOSED DISCRIMINATION.

As will be seen, a distinction is contemplated by the proposed law in favor of companies whose gross earnings reach only the minimum sum as against roads whose gross earnings reach the maximum sum stated; and this without reference to the relative net income derived by the different companies.

Let us examine farther into the operation of the proposed law.

And first we may remark that the operation

of a tax based on gross receipts, without reference to the relative cost of the property taxed, is in effect to confiscate the net revenue of the property in many instances; when the cost of a railroad is great its earnings must be proportionately great to enable the owner to realize a fair return on his investment; when the cost is small the return may be less.

A tax on gross earnings does not recognize these necessary distinctions.

A large portion of every railroad is built at a relatively heavy cost to the proprietor; this particular portion, however, is necessary to the system and can not be dispensed with; upon such portions of a road earnings amounting to ten thousand dollars per mile will not, perhaps, pay the cost of operation. On the other hand there are many long sections of property upon which gross receipts amounting to four thousand, or even fifteen hundred dollars per mile of road will afford the proprietors a very fair profit. A tax levied on gross earnings makes no distinction between these widely different classes of property, and in so far as it fails to do this it is apparent that it can not but be objectionable in its operations.

Discrimination between rival enterprises based on differences in gross earnings without reference to the cost of the property or the expense of operating is equally objectionable. The difference in the rate of taxation in such cases is in the

nature of a subsidy, which the State grants under certain circumstances to particular companies, to the detriment of other enterprises equally worthy of its protection. This subsidy, as we have already explained, is allowed (in the case of Wisconsin and Michigan) without reference to the relative net receipts of the property affected, and is, therefore, in many cases nothing more or less than a fund which the companies receiving it may retain at their pleasure or, if they see fit, may use in the procurement of business to the ruin or serious detriment of their less favored rivals. In Michigan this prospective rebate amounts to one per centum of the gross receipts. In Wisconsin it exceeds three per centum in some cases. There can be no doubt that discriminations of this character, if extended over the whole country, would not be warranted in many important instances, either by the value of the property or the net income of the companies it was intended to favor, and in so far as this was the case, it could not be but detrimental, if not destructive, to rival enterprises not equally favored.

OTHER OBJECTIONABLE FEATURES OF A TAX BASED ON GROSS EARNINGS.

A tax based on gross earnings is objectionable under the most favorable circumstances, even if applied uniformly to all companies without refer-

ence to the amount they earn. The directness and simplicity of the process of assessment and levy under such a system, and its easy accomplishment by the State, invites the constant interference in the legislature thereof.

The process of taxation based on gross earnings is too easy, too simple.

That is one of its chief defects.

If taxation were a blessing to be encouraged by the people who pay the taxes, then the case would be different. Unfortunately, however, it is the reverse of this, and one of the chief concerns of mankind is to restrict by every means in its power the amount of the annual tax levy.

Under the system of assessing the gross earnings of property, State legislators, ambitious of cheap renown, would see in the addition of a slight per centum to the tax on railroads, an easy process for relieving their immediate and more pressing constituents without risk or loss of local popularity; and thus difficulties brought about by the folly of our legislatures, or the folly of their representatives, the office holders, would be forever fastened upon the railway interest. Or in the absence of any inciting cause of a particular character, the burdens of the community would be placed upon the shoulders of the proprietors of railroads simply because they represented a small and unpopular minority, the processes for fixing

the tax upon them being simple and unmistakably certain in its results.*

The community thus apparently relieved of its burdens would cease to exercise that supervision over the acts of its servants which is so necessary to good government, and without which good government is impossible.

Only one termination of such a state of affairs could be possible.

A tax on gross earnings is objectionable on other accounts than those we have mentioned. If for any reason the business of a company is unprofitable then, under its workings, the greater the amount of business it does the greater the burden that would be placed upon its shoulders. We can easily conceive of a combination of circumstances engendered by active competition, or by depression of trade, or the restrictive laws under which railroads are operated, whereby the profitableness of a company's traffic might be destroyed; every day such a state of affairs continued would but add to its embarrassments, so

*"In certain States railroads are apparently looked upon as a species of windfall from which everything that can be exacted in the way of taxation is so much pure gain."—*Report of Committee of State Railroad Commissioners on Taxation; Proceedings of the National Convention of Railroad Commissioners, p. 17, A.*

This disposition would only be aggravated, we may believe, by simplifying, on the basis proposed, the processes whereby the railroad companies may be harassed by the States in question. In such localities our efforts should be directed to rendering it difficult, if not impossible, for the ignorant and vicious to make a foot ball of the railway interest. Surely we would not be accomplishing this by the adoption of gross earnings, so easily ascertained, so generally known, as a basis of taxation. That would be to invite the very evil we deprecate.

long as its gross earnings served as the basis of the amount it was taxed.

Whenever the business of a road is barely profitable, a tax assessed upon the basis of its gross earnings is in the nature of a prohibitory enactment by the State, forbidding its further continuance by the company interested.

Taxation based on gross earnings is objectionable because it invites discrimination between rival enterprises, as we have seen, a discrimination based on aggregate receipts without reference to the nature of such receipts, or their profitableness to the railroad company, or the cost of the property, or the net income derived from it.*

Taxation based on gross receipts possesses other objectionable features of a minor character, that we can not stop here to notice.

Leaving these out of consideration, however, it seems apparent in view of the more objectionable features that we have noticed in connection with this particular theory of taxation, that if taxes are to be based on gross receipts, the amount of such taxes should be added, at the discretion of

*A curious phase of the question of taxation based on gross earnings is presented in Massachusetts. In that State, as we have noticed in another chapter, the companies are compelled to charge a certain price on all supplies which they may transport for their own use. "All fuel, material (except gravel) and supplies hauled for company's use shall be credited to freight earnings at fourth class rates, charged to the proper accounts and included in the freight tonnage."—*Eight Annual Report of the Board of Railroad Commissioners (Massachusetts) January*, 1877.

Under these regulations if taxes were based on gross earnings the companies would be compelled to pay a tax for carrying their own material, as the charges which they make on such material go to swell their gross receipts.

the companies interested, to their current rates, as they were permitted to do by the general government under similar circumstances. In no other way that occurs to us can the baneful effects that we have pointed out as likely to follow the general introduction of a system of taxation based on gross earnings be obviated or lessened.

TAXATION BASED ON CAPITAL STOCK.

Taxation based on the capital stock or bonded debt of a concern is even more objectionable than taxation based on gross earnings. It has few advocates, and we may therefore dismiss it without consideration, as unworthy of attention here. While apparently correct in its conclusions, it is like the tax we have been discussing, fallacious in its application and unjust and impracticable in its every day operations.

TAXATION BASED ON REAL AND PERSONAL PROPERTY.

A system of taxation for railroads, based on the real and personal property owned by them, the assessment, as in the case of individuals, being made by persons present on the ground and familiar with local values, seems to be the least objectionable of all the methods we have noticed so far.

A tax on the real and personal property of railroad companies does not invite class legislation

to the same extent that would characterize a tax on gross earnings or capital shares.

Its valuation is real and determinable from year to year, being based on the condition of the property actually owned by the companies situated in the various taxing districts.

The gross earnings and the capital franchise tax is based, in many instances, at least, upon merely nominal values, and their conclusions in such cases are consequently fictitious. The realty tax does not possess these objectionable features in so great a degree, and is therefore more equitable in its workings.

The objections to it are that the assessments are not always made by persons competent to determine the true value of the property assessed, or otherwise perform the duties of their office properly, and in so far as this is the case, the system is unjust in its operations, both to the community and to the railway company; but while the justness of objections such as these can not be disputed or answered, they unfortunately may, with equally good reason, be made against our whole system of taxation, and are as marked and objectionable in the case of individuals as of corporations.

Another and more serious objection to the realty tax, as applied to railroads, is that it fails to take cognizance of the profitableness or unprofitableness of the companies' earnings, the tax

being the same whether the enterprise is productive or otherwise.

This objection is fatal, and for this reason:

THE RIGHTS OF RAILWAY COMPANIES.

So long as the State claims the right to fix the rates that railroad companies shall charge, or otherwise restricts their operations, it is its duty in all cases to ascertain the effect of its action before determining their responsibility.

If the State exercises the right of circumscribing the earnings of a property, it must circumscribe in a corresponding degree the taxes it imposes.

The right of sovereignty is not simply coercive, it must be protective as well.

When a government by its restrictions, direct or incidental, reduces the rates or income of a property, the amount of that reduction is in the nature of a tax imposed, and the effect upon the net profits of the concern affected must be fully considered before proceeding to lay an additional and direct tax upon it.

NET EARNINGS THE TRUE BASIS OF TAXATION.

The essence of railway property, as of all other productive property, is its net earnings.

It is for this that railroads are built; it is for this that they are operated; this is the Mecca of anticipation of their owners; and it is here that

we discover the true basis of taxation for this description of property.

In many of the States of the Union the railway is the slave of the State, the creature of its laws, and dependent upon it for its income; it requires, therefore, in every instance, special and exceptional consideration at its hands.

If the State restricts its earnings, it must not impose burdens inconsistent therewith.

And herein lies an unanswerable objection to any method of taxation of railway property not based on net earnings.

So long as the State restricts the railway company in its operations, the amount of the return the property yields to its owner must be the gauge of its responsibility. The various systems of taxation that we have noticed do not make this just and necessary distinction.

THE BELGIAN SYSTEM.

In Belgium, under in many respects the most enlightened government in the world, taxes upon railroads are levied on the basis of their net earnings. If a company has no net income it pays no taxes. It is not taxed upon its realty nor personalty. The State exacts a small tax on capital stock in the hands of its citizens, but does not require the holders of the shares to register the amount of their stock; the tax on the shares can therefore be evaded, and is evaded in the majority

of cases, it being the design apparently that the tax on net income shall be the full measure of the assessment against industries of this kind.

THE ENGLISH SYSTEM.

In Great Britain the general tax on railway property has reference, like that in Belgium, to its net earnings capacity. Thus while they (following the custom in force with reference to passengers traveling by stage coaches prior to the introduction of railroads) levy a tax of five per cent. on the gross earnings from passengers, they at the same time exempt fares that do not exceed a penny per mile for the poorer class of travelers. No direct tax is levied in England on freight, express, mail and miscellaneous earnings of railroad companies, as such. The British companies are, however, liable to an income tax on their net annual profits, and this tax must be paid before a division of the surplus is made.

The English system of taxation it will be seen, like that in Belgium, is (except in the case of a tax on a portion of the passenger traffic) a tax on net earnings, nothing being exacted from the companies on account of their receipts from freight, express, mail and miscellaneous sources in the event there is no surplus over and above the amount of their operating expenses and the tax levied on passenger receipts as described above.

The committee of our State commissioners already referred to, appointed to examine the question of taxation, especially commend the English system, but in their summing up I am unable to find in the method recommended by them any thing that nearly conforms to it in its operations. The conclusions of the committee in question, so far as I am able to understand, seem to be based entirely on the system of taxation in vogue in Michigan and Wisconsin; which system, as I have already described, is an income tax based on the gross receipts, without reference to the net surplus or gains of the property taxed.

THE TRUE BASIS OF TAXATION.

Whatever surplus there remains, if any, to a railway company after paying the working expenses of the property, this surplus is properly subject to taxation.

In all matters relating to the supposed value of a railroad, estimates are predicated upon the amount of its net earnings, for the reason that the great bulk of the property owned by a company has no value whatever except in connection with the immediate purpose for which it was provided; and herein I conceive to lie the correct theory of the taxation of railway property.

If a railway earns nothing, then the public who have enjoyed the benefits it confers without re-

warding its owners should not make further claims upon such owners:*

If the net earnings of the property have been meagre, then the tax gatherer's portion should be correspondingly meagre.

If the net receipts have been fair, then a fair proportion of such receipts should be allotted to the people of the State for the support and protection awarded by them.

If the net earnings have been bountiful, then the tax assessed may be corresponding in amount.†

These I conceive to be the true principles that should underlie the method of taxing railroad property.

Under so beneficent a system of taxation as this, the community of interest as between the State and its servant, the railroad company, in this respect, at least, would be complete.

If the owners of railroads receive nothing in return for the use of their property by the public, then and in that case they would not be required

*It may be said, perhaps, that this rule, if applied to railroads, should also be applied to individual cases. Under exactly similar circumstances, yes; not otherwise. Many of the industries of our citizens are especially protected by a tariff designed largely for that purpose, and in those cases where protection is not extended, the individual is left free to derive from his business, trade, or calling, such profit as his experience, foresight and capital render possible. The railroad companies, on the other hand, as already stated, are hampered by special laws, and in many cases their income expressly limited by legislative enactment.

†Under a method of taxation such as is here suggested, a company owning property not required by it in the operation or maintenance of its road would be taxed as in Michigan, the same as private individuals.

to make further contributions to it from their private means.

If, happily, they enjoyed a measure of prosperity, the public, their partners in the enterprise, would participate in its benefits.

Under such a benign system of taxation as this, the State would be especially concerned in fostering the interests centered in its railroads.

This direct and personal concern of the State is lacking under the present system; it now levies its taxes without reference to the ability of the companies to pay, after having fixed, without reference to the subject of taxation, the rate of compensation they shall exact for the service they render the public.

CONCLUSION.

I would say, in conclusion, that during the time railways are being constructed, and before they are opened for business, the method now generally in vogue of taxing them the same as private parties, seems to be in every respect right and proper.

But whatever the method of taxation for railways, both before and after completion, may be, whether based on real and personal property, shares, bonds, gross receipts or net earnings, such tax, when levied, should be final and in lieu of all other taxes on the property or securities of the companies whatsoever.

CHAPTER XXIV.

The Elements of Cost of Transportation — Facts That Must be Ascertained in Fixing, primarily, the Rate to be Charged —A Uniform Tariff Based on Equitable Grounds an Impossibility — What the Cost of Doing Business is Dependent Upon —Cost Must be Considered for Each Item Separately — Averages Can Not be Employed.

The foregoing inquiry into the operation of railroads makes it apparent that the cost of doing business can never, under any circumstances, be the same upon any two roads or upon separate sections of the same road. We have endeavored to point out, with more or less particularity, wherein the differences occur and the circumstances that give them birth. The conclusion we arrive at is that to enable us at any time to understand the status of a particular company or determine its relation to the public as a common carrier, authorized to charge a reasonable price for its services, we must ascertain all the features of construction and operation it possesses, many of which are, as we have shown, peculiar to it and not in any manner to be determined or weighed by the affairs of other enterprises of the same general character.

And when we come to examine the circum-

stances that govern the cost of operating a particular property we find that such cost during any one month or year never, by any possibility, represents the average cost of working it, for the reason that the expenditures for maintenance are not uniform, being at one period relatively very high and at another period comparatively low. The cost, for instance, of maintaining a new track or a track that has just been put in good condition, will be very light until the rails, ties and ballast require renewing; this is also true of buildings, fences, equipment and machinery, and all the varied plant a company requires in its operations. Consequently, to enable us to determine the cost of doing business, we must bulk the expenses for the period of time during which the plant of a company is undergoing this process of decay and replacement; when we have ascertained this average we may, by the addition of the transportation expenses and taxes, fix the cost of operating for the period of time our investigation covers, but not for any subsequent period of time, for the reason that for such succeeding period the cost of material and labor will not be the same as for the period that is past.

The cost of transportation never being the same under any circumstances for different periods of time, or for different properties, it follows that a uniform tariff, based on equitable grounds, is an impossibility.

The cost of doing business depends, as our examination has shown us, first, on the cost of the property,* and second, upon the expense of maintaining and operating it afterwards.

In attempting to determine the elements that must be considered in ascertaining the cost of transportation at any one time and upon any particular road we are struck with the innumerable phases which the subject presents, many of these phases being petty in themselves when isolated, perhaps, but making, in the aggregate, some of the most astonishing and perplexing business problems with which the human mind has to grapple.

The cost of maintaining and working a property is peculiarly dependent, as we have endeavored to explain, upon the quality of its traffic; upon the weight of its trains and the speed with which they are moved; upon the season of the year in which the business is done; upon the quality of the supplies that are used and their cost at the point where used; upon the price of labor and the skill, fidelity and experience that animates it;† upon the amount of the fixed expenses of a company; upon the extent and character of its

*And this cost, in the majority of cases, can only be partially ascertained in consequence of the defective system of book keeping in force upon our roads, as we have explained elsewhere, it being the rule in many instances, if not in the majority, to include in the cost of operating many items that properly belong to construction, the effect of which custom is, of course, to lessen the value of the property as shown by the books of the company owning it.

†The quality of the labor

repairs and renewals;* upon the condition and adequacy of the property; upon its extent;† upon the peculiarities of the country in which it is located;‡ upon the terminal expenses; and upon the amount it is taxed.

The cost of operating is also dependent, as we have explained, upon the uniformity with which trains are permitted to pursue their course without impediment from natural or artificial causes.

The relative proportion that the total expense of working a property bears to its earnings, the cost of operating being equal on different roads, is dependent upon the volume of business transacted and the price received for doing the same.

The cost of transportation depends, under all circumstances, upon the dead weight, or non-productive tonnage that must be moved. In the majority of instances the weight of the vehicle employed by a railway company greatly exceeds the weight of the traffic it carries; thus the weight of a car loaded with miscellaneous merchandise or furniture will, in most cases, greatly exceed the weight of its contents. This is also

*The outlays of this description will depend upon the thoroughness with which the property was originally constructed, upon the care with which it is subsequently kept in good order, and, as explained, the length of time that has passed since its completion.

†As we have explained in another chapter, the economy with which a property may be operated is more largely dependent upon its extent than is generally supposed.

‡By peculiarities I refer to the profile of a country, its climate, the nature of its soil, the drainage that it renders possible, the curvature of the track that it necessitates, the grades that it engenders, the facilities it offers for ballast, etc., etc.

the case with many other classes of freight; while the average gross weight of freight cars of all classes is in the neighborhood of eight tons per car, the average load which they carry, counting the cars that travel empty as well as those that travel loaded, is only about five and six-tenths tons; or, in other words, fifty-nine per cent. of the weight transported in connection with the freight traffic is non-paying. When we turn to the passenger department of the service we find the discrepancy between the paying and the non-paying load to be even greater than that mentioned in connection with the freight business, the non-paying load being about ninety per cent. and the paying load being but about ten per cent. The reason for this great difference is in the relative weight of the vehicles employed; the average weight of the car used in the passenger business exceeds tenfold the weight of its contents, the vehicles weighing from sixteen to thirty-six tons, according to the line and the class of traffic they are designed to carry, the average being about twenty-three tons, while the average paying weight which they carry, including the luggage cars, is not over two and one-half tons per car, or at the rate of about twenty passengers per car. There are, undoubtedly, lines of considerable extent where the average paying load will be greater than this, but taking the roads in the United States as a whole the average is a generous one.

The same difference that we find to exist between the paying and non-paying load, as applied to passenger and freight traffic, is noticeable in connection with the express and mail cars employed in conducting the traffic to which they appertain; in every instance we discover that the average non-paying load hauled in our trains is much greater than the average paying load, and if we take into account the weight of the locomotive and its load this discrepancy will be still further increased.

Aside from the question of dead weight which the companies are called upon to transport, the relative cost of transportation is dependent upon the equipment of a company having a full load in both directions, the great bulk of the expenses directly incident to the operation of trains not being dependent upon the amount of the load that is hauled; thus while the wear and tear is less and the amount of fuel and lubricants consumed by the locomotive is not, perhaps, so great for a light as for a heavy load, the expenses incident to the train force are the same in either case; the speed is the same, and the fixed expenses of the property are the same; many of the expenses, therefore, of a company that is so fortunate as to have a load for its cars in each direction may be said to be only one-half those of a company that has a load in one direction only, although the

aggregate amount of the traffic done by the former may be no less than that done by the latter.

Many of the expenses of a company, as we have shown, are not conditional on the amount of the traffic; a company's ability, therefore, to do business cheaply, is directly dependent upon the continuous employment of its rolling stock. If the equipment of a company is employed at intervals only, or as we have just stated, in one direction only, it is obvious that the company will be obliged to charge its patrons a higher rate to enable it to meet its operating expenses and the interest on the cost of its property than would be necessary if this hiatus in its affairs did not occur.

Not only is the relative cost of operating railway property not uniform in a single instance, but the relative profitableness of the various kinds of business or classes of traffic is not at any time exactly the same. We can not, therefore, in a single instance, determine exactly the result of a transaction without a special examination of the peculiar circumstances attending its conduct. A traffic that may be hauled with satisfactory results at one season of the year, or that may be sought for the purpose of enabling a company to give its force employment, would, at the same rates, prove undesirable at another period; thus the carriage of articles of freight of little value and that can consequently pay but a low rate, such as ice, the

coarser fertilizers, cinders, gravel, etc., that would be eagerly accepted by a company when its machinery and road was comparatively idle, would be rejected by it when business of a more important and valuable character pressed upon its attention.

While the volume of a business affects materially the cost of conducting it, this cost does not increase in the same ratio that the business increases; a train load can be carried for less relatively than a car load; the local traffic of a company that is moved but a short distance, or that is offered in driblets at different points can not be conducted as cheaply as a business having a longer haul or heavier in volume, and the relative expenses that are incident to transactions of the same general character, but differing in magnitude, are rarely, if ever, the same.

In estimating the cost of doing business all the influences, direct and collateral, that bear upon a transaction, must be severally ascertained and their effect accurately determined; general averages are of no account for such a purpose. The obligation to ascertain this cost specifically in each instance is imperative, and will remain so as long as the diversities that we have pointed out as to the cost of construction and operation continue.

CHAPTER XXV.

The Principles that Govern the Railroad Companies in Making Rates —Special Rates —Their Official Recognition Abroad — The Effect of Competition — The True Basis of Traffic Rates — The Rate Influenced by the Value of the Article Transported, by the Space Occupied, by the Attendant Risk, by the Quantity Carried, and by the Market Price of the Article — Noticeable Features Connected with the Application for Special Rates, and Their Use.

It is impossible to express concisely and absolutely the principles that operate in the making of the traffic rates of a railway company. Generally speaking, however, it may be said that they are governed as are all values, if left untrammelled, by the law of supply and demand, or in other words, by the measure of the urgency that gives rise to them: Competition, it may be said, intensifies the economic conditions under which they operate, while monopoly tends to modify them.

The general principles, however, that operate in the making of rates under a normal condition of affairs find frequent and important exceptions in the practical operations of railroads built or operated under abnormal or exceptional circumstances. The great number and complex nature

of these exceptions prevent our describing or enumerating them here; they are never found to be exactly the same in any two instances, however, but vary with the peculiarities of different properties, and the character of the officials who give them expression.

All the influences, immediate or remote, that affect the principles of transportation, are more or less generally known by traffic managers, and receive from them practical consideration in the framing of the standard tariffs that are promulgated from time to time; these influences also receive consideration in determining the special rates that are made to meet particular emergencies; indeed there can be no doubt but what the true principles of transportation receive more apt and full consideration in the case of what are called special rates than they do under any other circumstances: In other words, the special rates made by railroad companies, and about which so much has been said and written, more nearly represent the true economic theory of trade than any other; this is so for the reason that they represent more nearly than any other the true measure of value between what a thing is worth at the place where offered and the price it will bring after allowing a reasonable profit to the middlemen at the point of consumption or destination.

In the practical conduct of a railway company's traffic such rates are made, in particular cases, as

may be necessary to accommodate business that can not afford to pay regular prices, when there is a margin of profit in such business to the railroad company. "The principle which governs a railway company in fixing the rate is that of creating a traffic by charging such a sum for conveyance as will induce the produce of one district to compete with that of another in a common market."*

If left unobstructed in the operations of their property, special rates are made by railway companies whenever necessary to encourage trade or foster promising enterprises, provided the business that is offered can be done at a small profit, or, in particular instances, without loss to the carrier; in many cases, indeed, business is done by railway companies at a loss, in the hope that a remunerative traffic will grow out of the exceptional effort that is put forth to encourage it. "The power of granting special rates permits a development of trade which would not otherwise exist, and it is abundantly evident that a large portion of the trade of the country at the present time has been created by, and is continued on, the faith of special rates."†

Leaving out of consideration these well known and practical phases of the subject, it may be said that the volume of a traffic, in conjunction with the cost of constructing a property, and the

*Royal Commission on Railways. Report p. xlvii.

†*Ibid*, p. xlvii.

expenses incident to its operation should determine the price that is charged. This is absolutely the case, it may be said, in every instance where the government assumes to fix arbitrarily the rates that a railroad company shall charge; any other basis, in such a case, would presuppose an indifference upon the part of the government to the rights of the capital invested in the enterprise that would amount practically to an open and avowed assertion of its right to confiscate the same whenever it saw fit.

It needs no argument or illustration, it may be said, in this connection, to prove that a railway company is equitably entitled to base the price it demands for the services it renders upon the total cost of of its property and the expense of working the same, including a fair profit on the latter; in other words it is entitled to a reasonable return on the amount of the capital it has invested in the enterprise.* Rates based in this manner upon the cost of the property as a whole, may be termed the maximum limit of which a company is, or should be, legally or morally capable.

Taking the railroad companies of the country as a whole, the true basis of rates rests, primarily, then, upon the cost of the property. In the practical application of rates, in particular instances, however, the basis is that which will secure a re-

*In England, with its superabundant capital, ten per cent. is considered to be the maximum return that may reasonably be claimed by a company.

turn of the greatest profit to the railroad company on what it transports, and at the same time serve to encourage or stimulate the production of the article transported. This basis applies, it may be said, to the passenger as well as the freight traffic, the rates in the former case being fixed in all instances with a direct view to their favorable effect upon the passenger business.

The value of the product transported influences the rate that is charged, but not proportionately; a tariff based on the relative value of the articles carried would be prohibitory in many instances; the space an article occupies and the risk attending it while in the company's possession, affects the rate asked by the railway company; the indirect advantage to be derived from business also affects, more or less, the price that is charged. Railroads do a wholesale and a retail business, and the price they ask, in particular cases, is governed, more or less, as it is with all manufacturers, by the amount of the product they sell; the quantity of traffic that is offered materially influences, as is proper, the price asked by the carrier for transporting it.

The exceptionally intimate relations that certain articles of a standard character sustain to the community at large, is thought to affect favorably the price asked by the railroad companies for carrying them. It is more probable, however, that the influence to cheapen the rate proceeds,

as we have stated, from the quantity offered for carriage and the governing market price for such commodities at various centers of trade, rather than from the fact that the articles represent necessaries of life.*

In the practical operations of a railroad many special rates are made, under solicitation, for manufacturers, dealers, speculators, and others, that are never used; the rate at which the company can do the business not being sufficiently low to afford the other party to the transaction the necessary margin of profit. And finally, many of the so-called "special" rates, about which we hear so much, are so only in name, for the reason that when a rate is made to cover a given quantity, a minimum amount, we will say, and is not restricted in its operation to particular persons, it becomes a general rate, in fact.

*Referring to the influence which railway managers have over the rates asked, Mr. Joseph Nimmo, Jr., in his report of the internal commerce of the United States, for 1879, page 155, says: "The discretionary power which the managers of railroads are able to exercise in the adjustment of freight tariffs, and which they are able to bring to bear toward influencing the course of trade, is subject to several very important qualifying and limiting conditions proceeding from competition exerted through the markets, and from the direct influence which merchants and other citizens are able to bring to bear toward regulating freight charges in the general course of trade. * * * This is especially the case with respect to the rates for the transportation of grain, flour, provisions, and the other necessaries of life."

CHAPTER XXVI.

Division of Railway Disbursements — Can the Expenses o Railroads be Apportioned Between the Freight and Passenger Business — Gravity of the Inquiry — The Elements that Affect the Cost of Operating — Speed of Trains a Prime Factor — Weight of Trains Another Element — Popularity of the "Train Mile" as a Basis for Apportioning Expenses Between Passenger and Freight Traffic — What it is — Its Unreliability and Fallaciousness — Error as to the Average Relative Speed of Freight and Passenger Trains — Information on the Subject — Differences in Weight of Trains — The Elements of Cost Affecting Different Roads, etc., etc. — Cost Increases as the Square of the Velocities Attained — Testimony on the Subject — A Basis of Division That Would be Right for one Company Would not do for Another — Division of Maintenance Expenses must be Based on the Individual Performance of Locomotives and Cars — A Different Basis Necessary for the Apportionment of General and Transportation Expenses, and Deterioration of Property from Natural Causes—It must be Specific in each Particular case — Not enough Accountants in the United States to keep the Freight, and Passenger Expenses of Railroads Separately.

Fully fifty-nine per cent. of the expenses of a railroad belong in common to the passenger and freight business.

Upon what basis shall this fifty-nine per cent. be divided between these two kinds of traffic to

enable us to determine the average cost of carrying a passenger or a ton of freight?

Upon a correct solution of this question grave results are likely to hinge, for upon the basis of division, whatever it may be, state or national legislative bodies may at any moment in their supreme pleasure fix the average rate that a railroad company shall charge for carrying a passenger or a ton of freight. But until the expenses incurred in common by these different classes of traffic can be separated, it is impossible to determine the cost of each, and therefore manifestly impossible to predicate schedules of rates upon such cost.

Much inquiry has been given to the subject of a division of passenger and freight expenses, but up to this time without definite or trustworthy results. Estimates, to be sure, have been made, and continue to be made, by accountants, but they are one and all lacking in positive and definite value. The principal difficulty to be surmounted in making a division of the passenger and freight expenses, is to determine how far the elements of speed and weight affect the cost of operating. All those whose evidence in this matter we esteem worthy of acknowledgement, concur in this, that the cost of keeping the equipment and road bed of a company in order, and of many of the supplies used on trains as well, is directly affected by the speed of trains, but no satisfactory means has

yet been devised by which we may determine in what degree the different rates of speed affect the cost of maintenance and operation.*

But whatever the relative cost of operating freight and passenger trains may be, it will be found to be affected by the weight of the object moved. Or, to put it differently, the cost of moving an engine or car weighing forty thousand pounds and running at the rate of forty miles per hour, will be infinitely greater than of an engine or car weighing twenty thousand pounds moved at the same rate of speed.

The most specious and widely accepted formula for dividing expenses common to both passenger and freight traffic that has thus far been made use of, is the mileage of passenger and freight trains respectively. This method is called by its advocates the train mile basis. In its workings the total mileage of passenger and freight trains, respectively, is first ascertained, and the expenses are then apportioned, as between the freight and passenger business, on the basis of such mileage.

Under the operation of this theory of division, a passenger train of fifteen heavy and costly

* "The relative cost of different speeds of trains has never been definitely determined. * * Approximations * * have been framed in many quarters and in some cases by careful experts. These may be near the exact truth or they may prove to diverge from it considerably."—*Letter of Jos. D. Potts, President Empire Transportation Company, to Special Commission on Railway Mail Transportation, Report p.* 111.

"The same tracks are used for heavy freight trains, for light and heavy passenger trains running at speeds ranging from ten to forty miles an hour. It is therefore impossible to ascertain directly the cost of any given train."—*Report of Special Commission on Railway Mail Transportation, p.* 17.

coaches, drawn by two engines and moved at the rate of thirty-five miles per hour, is not more costly to a railway company, so far as affects the wear and tear of the plant, than a freight train of fifteen cars, moved at the rate of fourteen miles per hour.

The train mile basis disregards, substantially, all the varied elements of weight and speed so noticeable in the actual operation of moving trains; it is consequently fallacious in its conclusions, and results predicated upon it are manifestly unworthy of acceptance.

The adoption of the train mile basis has heretofore been accelerated, it seems apparent, in consequence of its simplicity and the deservedly high character of its principal advocate, and the superstition that attaches to all that he says, more particularly, perhaps, by those who get their knowledge of railroads, in great part, at second hand.

In discussing the adequacy or fitness of the number of miles traveled by freight and passenger trains, respectively, as a proper basis for dividing the expenses common to both kinds of traffic, Mr. Albert Fink (an authority in all such matters) says: "The speed of a passenger train is usually from two to two and a half times greater than the speed of freight trains, and on that account it would not seem unreasonable to estimate the cost of repairs of iron and adjustment

of track per mile run the same for freight and passenger trains. It is true that on a perfectly smooth track the speed of a train would have but little influence upon the wear of the iron. In practice, however, there are more or less imperfections in a track, especially at the joints, and the wear and tear of the track must necessarily be increased as the speed of the trains increases. I fear that it will be impossible to ascertain the exact amount of such increased wear, but am inclined to believe that the cost of repairs of track and its adjustment is very nearly the same for freight and passenger trains, when the relative weight of trains and rate of speed is about as above given."*

In another place (p. 49) he says: "It can be fully demonstrated that upon a perfectly smooth track the wear should be the same per ton moved, whether the train moves at a high or low speed."

How can this important fact be fully demonstrated; or is there any such thing as a perfectly smooth track?

I do not remember ever having heard it asserted before by an authority so generally worthy of our regard, that it was possible to accurately determine the relative cost. On page 14, he says: "The road bed, ditches, ballast, cross ties, bridges, etc., must be kept in the same good order, and the same amount of money must

* "*Cost of Passenger Traffic*," p. 14.

be expended on this account, whether they are used by passenger or freight trains; therefore each class of traffic should pay proportionately to the train mileage."

In other words, he repudiates the idea that the cost of operating a railroad is at all dependent on the weight or speed of its trains. This, I believe, is contrary to the facts in the case, as it is contrary to all generally accepted belief on the subject.*

Considering the importance to the railroad interest of an accurate division of the expenses as between the passenger and freight traffic, if a divi-

*The evidence of experts on this subject is uniform, and not at all in harmony with Mr. Fink's conclusions.

"There is a possible rate of speed which would produce a momentum and impart a wrenching of parts sufficient to work the speedy annihilation of both track and train." *Letter of Jos. D. Potts, Special Commission on Railway Mail Transportation, Report, p.* 111.

"Force * causes wear and tear of rails, fastenings, cross ties and ballast, and the expenditure necessary for their readjustment and renewal, and in the same manner operates upon the machinery and rolling stock." *Letter of Strickland Kneass, Assistant President Pennsylvania Railroad Company to Special Commission on Railway Mail Transportation, Report, p.* 53.

"Speed increases the cost directly * * * it reduces the load, which is a much more serious thing than the mere cost of the engine. A train to cover thirty miles an hour would cost more than a slower train, and the latter would drag half more carriages. I am speaking of the locomotive cost. Every other account, such as signals, permanent way, etc. will increase with speed, because you must have your signals much better, and the cost of maintenance is greater, because the rails are damaged to the same extent as the engines * * * "If the speed were diminished the work might be done with fewer trains." *Evidence of Mr. A. Sturrock, before the Royal Commission, p.* 884.

"I believe it will be found that the wear and tear of the road is mainly due to the heavy engines running upon it at from forty to sixty miles an hour." *Evidence of I. P. Bidder, C. E., before the Royal Commission, p.* 831.

"We are obliged to run at much higher speeds than it is prudent to run for the good of the permanent way. * * * A slower speed * * * would certainly reduce the cost of the working expenses." *Evidence of D. Gooch, M. P., before Royal Commission, p.* 860.

sion must be made, it would seem as if conclusions based upon a thing so indeterminate as the velocity of passenger and freight trains, the relation of one to the other being "from two to two and one-half times" is exceedingly incomplete and unsatisfactory, to say the least. But such seems to be the basis substantially upon which the train mile theory rests.

Unfortunately, however, this basis, poor as it is, seems not to be even substantially accurate in all sections of the country, however it may have been in the locality where the investigations in question were made. Instead of the speed of passenger trains being "from two to two and one-half times greater than the speed of freight trains," the speed is only about one-half greater. On lines leading from Chicago and representing eleven thousand five hundred miles of road the average speed of passenger trains is twenty-one and two-tenths miles per hour, while the speed of freight trains is fourteen and four-tenths miles per hour. Between Chicago and the Missouri River stock trains are run at the rate of twenty miles per hour, while the average time of a passenger train between the same points is only twenty-one and one-eighth per hour.† The fast mail train between New York and Chicago averaged thirty-eight miles per hour. Upon many lines the speed

†*Investigations of Mr. T. M. Fish, Superintendent of Trains, Chicago, December*, 1879.

of passenger trains does not exceed fifteen miles per hour. Within certain limits the speed of trains depends largely, if not wholly, upon the nature of the traffic and the character of the road. In many cases trains are made up indiscriminately of passenger and freight cars.

The above comparisons covering a wide range of country, are sufficient to indicate the wide diversity that exists in reference to the speed of trains of the same class, but of different grades. They abundantly demonstrate the worthlessness of the train mile basis, even if the theory were right, which can not for a moment be admitted.

The differences that mark the weight of trains are even greater than those that mark their speed. The weight varies for goods trains all the way from a train of fifty wagons heavily laden with grain or timber, or ore or fuel, to a train made up of an engine and a single car. Equally great differences are observable in connection with our passenger trains. Can such differences be ignored or overlooked in devising a method for dividing traffic expenses?

Apparently the train mileage basis, at least, takes no account of them.

Other extravagancies almost as marked occur to us. Is it right, for instance, to compare, upon a general average, a train of passenger cars weighing, when loaded, forty tons each, and moving at a high rate of speed, with a goods train

of vehicles which weigh only twenty tons and move at moderate rates of speed?

Is a train filled with cars partly loaded to occupy the same level in the division of expenses that a fully loaded train does?

Manifestly not.

When we have ascertained the relative percentage of the cost of different classes of trains upon a particular road or track, does this data possess any value whatever upon any other road or track? We know that it does not; that such cost is directly affected by the kind and quality of metal contained in the track, by the elevation and curvature of the road, by its grades, its cuts and embankments, the character of the ballast, the elasticity of the track, the adequacy of the drainage and a host of other features peculiar to each property.

Weight and speed being elements of cost it is apparent that any variation in the weight of a train or the velocity with which it moves will necessitate a schedule arranged for that particular train, and based on its weight and several rates of speed.

The train mileage basis utterly ignores all these necessary and vital differences of cost.

So far as I am informed, the train mileage theory of division has nowhere been accepted by competent authority as at all conclusive, except by various governmental officers and others who

have been led to adopt it, partly in consequence of their belief in the experience and acknowledged ability of some of its advocates, and partly on account of the simplicity and economy of its workings.

The practices of railroad companies, where they attempt a division of expenses, are not uniform: The Pennsylvania Company, we are told, estimate that one-third of the expenses belong to the passenger traffic, and two-thirds to freight. On the Erie railway, two-fifths of the expenses are allotted to passenger traffic, and three-fifths to the freight traffic. The division is made by these companies merely for local purposes, but the method of apportionment they enforce is not more arbitrary or less reliable than the train mileage basis.

So far as determining accurately the division of expenses, all the methods in vogue, including the train mile, are lacking in comprehensiveness. They are, generally speaking, mere guesses, estimates that may approximate the truth in particular instances, and when applied to particular properties, and vary widely from it in other cases.

It is stated by the best authorities upon the subject that I have studied, that speed has a direct and positive effect upon both the track and the machinery. Much that we have already quoted demonstrates this. "The speed at which any article is carried on a railway is an element

of cost. It is well known to railway managers that on a double track located on a heavy grade, the rails on the down grade are worn out faster than those on the up grade. A *priori* this would not be expected, for the reason that there is much more slip of the driving wheels in going up the grade than in going down, and the slipping of wheels is a potent element in wearing out rails, but experience shows that the greater speed of trains on the down track more than compensates for the difference in slipping. I have known rails of the same quality to be worn out on the down track in two-thirds of the time that sufficed to wear them out on the up track, with the tonnage not greatly varying, the number of engines and cars, of course, being identically the same. This would go to show that speed is an important element in cost."*

Not only is speed an element of cost, but the cost increases approximately with the square of the velocity attained, *i. e.*, if it costs one hundred dollars to run a train one mile, the velocity being ten miles per hour, it would cost four hundred dollars to run the train if the speed were increased to twenty miles an hour. Such, substantially, are the conclusions of the most eminent engineers who have given the subject investigation. Strick-

*Letter of Wm. P. Shinn to Special Commission on Railway Mail Transportation. Report, p. 66.

land Kneass, Esq., in a letter to the commission already referred to,† says :

" The active force of a train running at the speed of thirty miles per hour, will be found to be 100 per cent. greater than that of the same engine running at twenty miles per hour, while the increase of speed is but fifty per cent. It is this force that causes wear and tear of rails, fastenings, cross ties and ballast, and the expenditure necessary for their readjustment and renewal, and in the same manner operates upon the machinery and rolling stock for their general derangement and deterioration * * * we know that the wear upon rubbing surfaces of machinery increases as the square of the velocities, so that again the wear and deterioration of the moving portions of an engine, running at thirty miles an hour, is over 100 per cent. greater than that on an engine running at twenty miles per hour, while the increase in oil, waste, etc., is proportional * * * increase of speed reduces the effective force of an engine * * * we would state that owing to the 'back pressure' before noted, the increased velocity can not be retained without a higher pressure of steam in the boiler, which can only be obtained by a further use of fuel, while a waste in fuel is caused by increased speed, owing to the greater draught through the

†*Page* 52.

boiler tubes, carrying with it portions of the fuel without combustion or diffusing heat."

Nothing could be more definite or sweeping than this carefully worded statement.

The cost entailed by increased speed is not confined to the rails and the adjustment of the track, but embraces indifferently, rails, cross ties, track fastenings, ballast and machinery. It also increases the cost of fuel and lubricants, and decreases, in a marked degree, the load that can be hauled.

Mr. John B. Jervis, a gentleman of great observation and high scientific attainments, and a noted engineer in his time, says: "We have no exact data to determine the relative cost of different rates of speed; some have estimated it to be as the squares of the velocity; others a lower rate of difference; my own opinion is that on the whole the former is not far wrong. With two engines of suitable weight, one to haul a train at the rate of twenty miles per hour, the other to take the same train thirty miles per hour, the cost per mile for the train having a speed of twenty miles per hour may be approximately estimated at one-half the cost of a train having a speed of thirty miles per hour. This of course embraces not only the engines, but the cars, coaches and track, all of which suffer increased wear and damage from increased speed."*

*Railway Property, p. 155.

Our engineers are not isolated in the statement they make that the cost of operation increases with the square of the velocity. In Europe, where great attention has been given this subject, the same basis is generally accepted, and the speed with which traffic is carried occupies an important relation to the rate that is charged. "Foreign railway companies recognize that speed is the essence of expense, by making lower rates for passengers and freights carried by slow trains. The estimate of experts is, that expenses increase as the square of velocity; but the ratio is even greater, that is, if the speed of the engine is doubled, the cost of the wear and tear of the road is more than quadrupled."*

It being determined that cost increases approximately with the square of the velocity, the expenses incident to the maintenance of the road bed and track must be divided upon that basis. The cost of a passenger train that occupies thirty-four hours between Chicago and New York would, in such a division, be sixteen times greater than that of a freight train that requires one hundred and thirty-eight hours.†

**Memorial of Presidents Alexander Mitchell and Albert Keep to the Senate and Assembly of Wisconsin*, 1875, *p.* 10.

†The average speed for freight per mile, including stops, between Chicago and New York is, by the Michigan Central Railroad 6 6-10 miles per hour; by the Michigan Southern Railway 6 8-10 per hour, and by the Fort Wayne Railway 6 1-3 miles per hour, while the speed of passenger trains is, as already stated, 26½ miles per hour.

Under the operation of the train mile theory the cost is the same.

The conclusion at which we arrive after having given the subject much careful consideration, is that a basis of apportionment of freight and passenger business that would be right and equitable for one company would not answer at all for another company.

That all the diversities of cost peculiar to different properties as they have been severally recapitulated by us in the preceding chapters, must be ascertained and considered in each instance before fixing the basis of division.

The quality of the track and machinery must be determined in every case before fixing the basis of apportionment. It is manifest that the cost of moving a loaded vehicle at the rate of ten miles an hour on a good track can not be relatively the same as the cost of moving a similar load over a less perfect track at a speed of twenty miles per hour; nor can the cost of moving a heavily loaded train at the rate of fifteen miles per hour be the same as for an empty train or a train partially loaded moving at the same rate of speed or at the rate of ten miles per hour.

Inequalities of this character, and their relative effect, upon the cost of operating must be remembered and provided for in any method that may be devised for separating the expenses.

A trustworthy basis for dividing expenses

between passenger and freight traffic must take cognizance of the effect (and cost) of different rates of speed upon the road. The weight of the trains must also be considered. Thus a graduated scale must be provided for each class of vehicles. This scale must give the cost per mile of trains of different weight and speed, commencing, say, with trains of a certain class, weighing eight hundred thousand pounds, and traveling at the rate of fifty miles per hour, down to trains of a corresponding grade, weighing one hundred and sixty thousand pounds, and moving at the rate of eight miles per hour.

In other words any division that may be adopted for separating passenger expenses from freight expenses must be based on the individual performance of the engines and cars actually employed: Each engine and car must be followed wherever it goes, and the cost apportioned to the traffic it carries on the basis of its gross weight including the load, and the speed with which it travels.

And in basing the cost upon the speed a vehicle attains, specific rates of speed must be figured separately. Averages will not suffice. Thus the cost must be ascertained for the distance at which a car or engine travels, at the rate of eight miles an hour, the cost for nine miles an hour, and so on up to the highest rate of speed it attains, and in this connection it must not be forgotten that all of these different rates of speed

at which trains are moved are more than likely to be attained by a vehicle in traveling, under ordinary usage, over fifty miles of continuous road.

Under these circumstances the method of dividing passenger and freight expenses on the basis of the individual performance of locomotives and cars seems impossible, from the amount of labor it involves and the detailed reports it entails. And it is practically so. Nevertheless, it is impossible to devise any method whereby an accurate and trustworthy separation of the cost of maintenance of roadway and track (the most considerable items of expense in the economy of railway operations) can be secured as between the passenger and freight traffic, except upon the basis of the weight and speed of locomotives and cars.

However, while the individual performance of cars may be accepted as a trustworthy method for dividing the expenses of maintenance of track and equipment it will found that it is not a proper basis for dividing the other expenses incident to the operation of a property and common to its freight and passenger traffic. The relative proportion of such expenses belonging to each kind of business, it may be said, is never the same upon any two roads, nor is the proportion the same from day to day on any particular road. Nothing could be more variable. The superintendent of a company for instance, does not devote exactly the

same amount of labor to the passenger and freight traffic respectively each day. And this is true of all the disbursements for labor affecting both classes of business.

And in reference to the joint traffic expenses for maintenance and other purposes, they are not uniform from day to day, nor are they to be apportioned between the two kinds of business upon the basis of earnings or upon any other arbitrary division that can be devised; the separation to be of any value must be specific in each and every case, and must be based for labor on the amount of time devoted to each class of business, and for other expenditures upon the actual use or benefit derived by each class of traffic from the disbursement.

The particular classes of expenditures of the kind we refer to that affect to a greater or less extent both classes of traffic, it is impossible to enumerate in detail. They embrace such items as the deterioration, from natural causes, of the property that is used in common by, or is necessary to both classes of traffic; The disbursements of a company for fuel and other supplies used by locomotives employed in common upon freight and passenger traffic; The cost of keeping such engines in repair; The cost of repairing and renewing buildings used in common by both classes of traffic; The cost of the supplies used at the various stations and shops; The wages and

expenses of employes, such as agents and their assistants, including the laborers employed about the stations and occupied in connection with both kinds of business, etc., etc. The expenses that are common to both passenger and freight traffic also include the taxes of railway companies; their disbursements for lawyers, court expenses, and damages of a general character; the amount paid for rents, stationery, advertising, and foreign agencies, where the object of the expenditure is for the general good: They also embrace the salaries of the principal officers, including their assistants, and all the expenses incident to the organization and management of a company of a general nature. These disbursements comprise the principal items of expense, (except those relative to the road proper already noticed,) in which both classes of traffic are more or less interested, and it is manifest that before we can hope to know the cost of conducting the passenger traffic or the cost of conducting the freight traffic, all these expenses, with those already recapitulated, must be accurately ascertained, and must be divided in exact accordance with the disbursements which each class of traffic engenders.

In conclusion, it may be said that the more that we examine into the question of the feasibility of making the divisions rendered necessary by a separation of the cost of conducting the passenger business from the cost of

conducting the freight business, the more we will be impressed with its impracticability. To say that there are not enough accountants in the United States to keep an *accurate* account of the division of the passenger and freight expenses of railroads is probably not exaggerating the amount of labor such a separation would involve.

The cost can not be estimated.

The difficulties that surround the work are to be regretted, but we can not ignore them nor disregard them in considering the subject, any more than we can disregard any of the thousand and one phases of the railway problem that do not tally with our preconceived notions or prejudices on the subject.

CHAPTER XXVII.

The Proportion that the Various Items that go to Make Up the Operating Expenses of Railroad Companies Bear to the Total Operating Expenses — Our Lack of General Information on the Subject — An Illustration of the Relation the Various Items of Expense Bear to Each Other — Relative Proportions of Maintenance and Transportation Expenses.

In the preceding chapters the expenditures of railroad companies, in their relation to each other and to the public, have been quite fully explained and discussed. One particular phase of the subject, however, remains to be noticed, viz: The proportion that particular operating expense accounts of railroads bear to the total operating expenses.

In another place we have shown that 64 per cent. of the total disbursements of railroads is for current working expenses. This statement gives rise to the interesting inquiry: What are the items that make up this large sum, and what relation do they bear to each other and to the whole? This question, I am sorry to say, can only be partially answered, owing to the lack of uniformity in the method of book-keeping, and in the form

of the returns rendered by the different companies.

The classification of expenses is, unfortunately for our purpose, not the same on different roads; it is only, therefore, by taking the returns of a particular company for a long period of years, that we can hope to arrive at an approximate estimate of the relation particular items of expense bear to the aggregate. This has been done. For the purpose of arriving at the information sought I have taken the published returns* of a company operating on an average some 1,500 miles of road,† and from these published statements of this large and well managed property have compiled the subjoined table.

ITEMS.		Per centage that each bears to the whole.
Maintenance of Equipment		17.92
" " Buildings		2.42
" " Fences, Gates, and Crossings		.81
" " Bridges and Culverts		2.61
" " Track		20.01
" " Tools and Machinery		1.64
Fuel used	(Transportation)	13.61
Oil, Waste, and Tallow used	"	1.31
Foreign Agents and Advertising	"	.84
Stationery, Printed Blanks, Tickets, etc.	"	.78
Train Force	"	13.09
Station Force	"	15.34
Management	"	1.22
Rents	"	.33
Losses and Injuries	"	1.52
Miscellaneous Expenses	"	1.49
Taxes	(General)	5.06
Total		100.00

*From 1864 to 1879, both years inclusive.

†The North Western.

This exhibit, it will be noticed, is well arranged for the purpose for which we desire it, and sufficiently elaborate for all practical purposes. The great property operated by the Northwestern company is representative in many important respects of the general railway interests of the country; the exhibit, consequently, may be accepted as illustrating approximately the operations of the railway system in its entirety.

In connection with this statement it will be noticed by those familiar with such matters that the expense of keeping up the property,* is 45 41-100 per cent. of the entire amount disbursed; or, to express it differently, out of $100,000,000 expended for operating expenses,† $45,410,000 were for repairing and renewing the plant; the remainder was disbursed for purposes that did not contribute any thing of a tangible character to the real or personal property of the enterprise, $5,060,000 being disbursed for taxes, and $49,530,000 for services and supplies expended in connection with the conduct of the company's traffic.

*i. e. The cost of maintenance.

†The payments for the fifteen years were $107,103,712.15.

CHAPTER XXVIII.

Railway Mortgage Bonds — How the Money with which Our Railroads have been Built was Raised — The Capital Represented by Mortgage Bonds — Nature of the Indebtedness — Railway Mortgage Bonds Described — Manner of Negotiating the Sale of Bonds — The Rights of Bondholders to Vote at Meetings of Stockholders — Effect of this Privilege on the Policy of a Company — Income Bonds — Special Property Mortgages — Extent to which a Property may be Safely Encumbered — A Multiplicity of Mortgages No Evidence of a Lack of Prosperity — How Railroad Capital is Raised in Other Countries — A Mortgage Not Sufficiently Elastic to Answer the Requirements of Railroads — Much of the Property that has been Foreclosed and Sold would, if Retained, Ultimately have Paid a Handsome Profit — Duties of Mortgage Trustees — Mortgages Take Precedence in the Order of their Dates — Debenture Stock — What it is, and the Rights Possessed by the Holders — Laws Governing the Recording of Railway Mortgages — Coupons — Their Form and What they Are — How they are Collected — Registered Bonds — Their Character and Advantages — Method of Accounting for Interest on the Funded and Floating Debt of a Railway Company — The General Principles to be Observed — The Coupon Register — Its Simplicity and Usefulness.

We come now to expenditures of a different class from those we have heretofore been considering. These expenditures relate to what are sometimes termed the fixed expenses of railroads,

in contradistinction to their operating or working expenses. The expenditures in question appear in the returns of railroad companies under the following heads, viz.: interest on bonds; rental of leased lines; dividends and sinking funds.

Let us take up these items in the order named, giving such brief description of the immediate surroundings of each account as may be necessary to enable the reader to understand generally the extent and importance of the outlay they are severally intended to embrace.

The bulk of the money used in the construction of the railway system of the United States was raised by mortgaging the property.*

The mortgages upon the real and personal property of our railway companies are commonly designated as the funded debt of the corporations responsible for them. This debt is an absolute lien upon the property specified in the instrument creating it.

The funded debt of a railway is usually represented by bonds bearing the company's seal and signed by two or more of its officers and countersigned by the trustee of the mortgage; these

*The amount of the outstanding shares of stock of our railroad companies is nearly as great as the amount of their mortgages; there is only a difference of $5,500,000, but the former having only a secondary hold upon the property commanded when offered for sale only a relatively small sum.

These mortgages amounted in 1878 to $2,297,790,916 and the interest paid upon them during that year amounted to $103,160,512.00 or 22½ per centum of the total disbursements of railroad companies for incidental purposes.—*Poor's Manual for* 1878, *p.* 7.

bonds vary in amount from one hundred to one thousand dollars each.

Where there is more than one mortgage upon a piece of property the relative position of the various mortgages is indicated in the designation of the bonds as a "first mortgage bond" or a "fourth mortgage bond." It sometimes occurs that a mortgage is a first lien upon one piece of road, while it occupies a secondary position upon another piece of property, whatever security the last mentioned lien affords being added as an additional measure of safety to the security afforded by the first mentioned lien. A railway bond recites, in each instance, the rights it enjoys under the mortgage.

The owners of these securities are called bondholders.

Sometimes the bonds of a railroad company are sold directly by its officers; it more frequently falls out, however, that the sale is made through a broker. In the latter case, the broker either receives an agreed commission for his services, or he buys the bonds outright and sells them at such advance as he is able.

Bonds are issued to run for various periods from one year to fifty years.

For the purpose of protecting the bondholders against the shareholders, the former are sometimes allowed the same privileges in reference to voting at the annual and special meetings of share-

holders that the latter are.* The result of such a policy is to secure a very conservative administration so far as the payment of dividends is concerned, as it is the interest of the bondholders to divide as little of the surplus as possible among the shareholders and expend as much as possible in improving and building up the enterprise: every dollar expended upon the property being so much added to the security of the bondholder.

While a lien on the real and personal property of a road is the usual course pursued when a company desires to raise money by mortgage, yet its necessities are sometimes so great as to compel it to encumber such surplus earnings as it may have after satisfying all claims upon the property then existing, including the necessary current expenses incident to its operation. Obligations of this character are usually designated as Income Bonds.

It sometimes happens that specific articles of equipment such as particular buildings, bridges, engines, cars, or machinery, not already encumbered, are separately mortgaged by the company owning them; in such cases the name of the mortgage indicates the nature of the security upon which it is based. Mortgages of this charac-

*When the mortgage bonds of a railway company are entitled to vote at its meeting of stockholders they are governed by the same general rules described elsewhere for shareholders; books are kept in which the names of the holders are recorded, and notice must be given the latter of any meeting of stockholders, etc., etc.

ter, as well as mortgages based on net income, generally run only for a short period of time, the nature of the security they afford being of a variable or transitory character.

The extent to which a new road may be encumbered is dependent, or should be, upon its estimated net receipts when completed. Upon lines already in operation the basis of value is upon the known income of the property. The prospects of the enterprise are also taken into consideration in fixing its worth.

Instances are known of the presence of five distinct mortgages upon the same piece of property. A fifth mortgage would not seem to be a very valuable security, nevertheless, it may be preferable in every way to a first mortgage upon another piece of property. In the case referred to the interest on the fifth mortgage was promptly met as it accrued and the mortgage itself commanded, with the other liens upon the property, a handsome premium upon its par value in all the general markets of the country.

Where there are more than one mortgage upon a road the dates of the several mortgages may be said to represent approximately its different stages of development, the money realized from them being expended in improving the property and extending its facilities. They are, therefore, in no respect evidence of a lack of a company's prosperity. Quite the contrary.

In other countries the bulk of the money expended in building railways is represented by certificates of shares in the capital stock, the dividends paid upon this stock being dependent upon the prosperity of the company issuing it. This class of security is not, however, sufficiently definite or formal for the great bulk of our people; they want something that is conclusive and not dependent in any way upon the discretion of the management of a company; and herein they are right, so far as the obligation imposed on the latter acts as a prohibition or deterrent against extravagance and ill timed enterprises.

But a mortgage, unfortunately, makes no distinction between a property destitute of value in itself, either presently or prospectively, and a property requiring only time to build up within it the qualities necessary to make it valuable. Many of the mortgages that have been foreclosed and the property they covered sold at a deplorable sacrifice to the owners of such mortgage securities would ultimately have returned a handsome profit upon the investment had the owners patiently abided the growth or recuperation of the enterprise. Generally speaking, it may be said that the tenure of a mortgage is too rigid, too exacting for the exigencies of railway management.

Every mortgage provides for one or more trustees, whose duty it is, if the interest or prin-

cipal is not paid when due or within a specified time after it falls due, to advertise and sell the property when called upon by the bondholders in the manner and form prescribed in the instrument. Usually the mortgage prescribes the minimum amount of bonds required to compel action upon the part of the trustee; this amount is purposely made so small as to protect all the holders in the event of a default by the company. In the event of a default being made the trustee can, if he chooses, go on and foreclose the mortgage without reference to the holders of the securities; such is the discretion usually allotted him.

Mortgages on a property take precedence according to their respective dates, thus the foreclosure of a third mortgage does not affect mortgages of a prior date, but the foreclosure of a first mortgage invalidates all other mortgages; but if there remains any surplus over and above the amount required to satisfy the first mortgage, such surplus must be divided among the holders of the next succeeding mortgage and so on. Usually in the event of the foreclosure of a first mortgage, or of any mortgage, the holders of the next succeeding mortgage possess the right of redemption, *i.e.*, by the payment of the mortgage that is foreclosed the subsequent mortgage becomes a lien upon the property in its place.*

*In the event the requirements of an inferior mortgage are not satisfied the holders of such mortgage can compel the holders of prior mortgages to

In Great Britain railway companies issue what is called debenture stock. This is the favorite form of railway security in that country. This stock has a fixed rate of interest and is a positive lien upon the property specified, but there is no trustee, no definite form of procedure involving the whole mortgage as in this country. The holder of a certificate of debenture stock can, if the interest is defaulted, levy upon the property of the company responsible for it wherever found and place his name upon it and hold it until his claim is satisfied. Co-operation with other holders is not obligatory and the sale of property proceeds no farther than is necessary to reimburse the disaffected holder.

In some States of the Union the law requires that a mortgage upon a railroad to be valid must be recorded in full upon the books of the recorder of deeds or other designated officer in each county through which the line passes. In other States it is only necessary to record the mortgage at the State capital. Manifestly the last mentioned plan is the least expensive and seems to answer all the requirements of the transaction.

An unrecorded mortgage has legally no value as against a recorded mortgage or the judgment of a common court.

Attached to each bond are diminutive drafts

become parties to the foreclosure proceedings, thus forcing the holders of such prior bonds to accept payment for the same in advance of the time originally specified.

or orders called coupons.* Each installment of interest provided for by the bond, whether annual, semi-annual or quarterly, for each year that the mortgage runs, is represented by a coupon. There are sometimes as many as two hundred coupons attached to a bond. A coupon when due is a draft upon the company owing it, and is detached by the owner of the bond and presented for payment or deposited with a bank or other agency for collection as in other cases.

The registered bonds of a company are different from its coupon bonds in this, that while the latter are payable to bearer, the former can only be collected by the person in whose name they are registered upon the books of the corporation. The name of the owner of each registered bond is inserted in the body of the instrument; no coupons are attached to the bond. When the interest upon it matures the company responsible for

*FORM OF COUPON.

ON THE FIRST DAY OF JANUARY, A D 1880,

THE MINNEAPOLIS & SOUTH PACIFIC RAILWAY COMPANY

Will pay to the bearer hereof THIRTY-FIVE DOLLARS, IN GOLD COIN, at its office or agency, in the City of New York, or, at its option, SEVEN POUNDS STERLING, at the office or agency of the BANK OF MONTREAL, in the City of London, England, being SIX months' interest due on that day on its ($1000) First Mortgage Gold Bond, No. 236.

$35 £7 1

Dated JUNE 21st, 1879.

HENRY A. GRAY,
SECRETARY.

it forwards the funds to the address of the person in whose name it is registered, or proceeds in such other manner as may have been agreed upon. The owner of a registered bond is thus secured against possible loss by theft or otherwise either of the principal or interest. The expense and trouble of transferring a registered bond upon the company's books of record, whenever the security changes hands, detracts very much from its value in the estimation of a large class of holders. This objection finds expression in the market value of the respective securities, the coupon bonds, as a rule, commanding a higher price than the registered bonds.

The bonds issued by our railroad companies, and those issued by the government, are very much alike in form, and the manner of paying the interest is much the same.

No definite rule save the convenience of the company issuing the mortgage is followed in fixing the date for paying the interest on its bonds. Sometimes, but rarely, the interest is paid only once a year; it is frequently paid quarterly; but more frequently still it is paid semi-annually.

INTEREST ON THE FUNDED AND FLOATING DEBT — METHOD OF ACCOUNTING.

The amount of interest on the funded debt of a company constitutes properly a separate item in

its profit and loss account; the amount should be charged up, together with all premiums on the same, under the head of *Interest on Bonds*, monthly as it accrues,* without reference to the date of its payment, *Accrued Interest on Bonds* being credited. In this way the interest account is equitably divided over the whole financial year of a company, and its liability for interest is always made apparent.

In reference to interest that may have accrued on bonds issued by a company at the time of their sale by it, such interest, it seems to me, should in all cases be credited to the account for interest on bonds at the time the securities are disposed of.

The amount disbursed for "*Interest on the Floating Debt*" of a company, is an account analagous to that of Interest on Bonds, and should appear separately upon the books and in the profit and loss account under the above heading. Interest on the floating debt should be entered upon the books in the month in which it is due.† All

*"The amount should be entered on the books of the company each month, as it accrues, estimating the interest for six months in advance, from the commencement of the fiscal year, on the basis of the bonded debt at the time the estimate is made. In this way, one-sixth of the interest for the half year will be entered up monthly; any differences that may occur in consequence of bonds being withdrawn and cancelled, or new bonds issued during the half year being considered in the charge to 'Interest on Bonds' for the sixth month." *Old Regulations.*

†It can not be charged as it accrues, as the amount is not determined, in many cases, until the transaction is closed. The multiplicity of the transactions would also make the labor of accounting exceedingly complicated, as well as expensive. When, however, the amount of a transaction is of any considerable magnitude, it would be well to enter the interest on the books from month to month as it accrues, or at the end of the fiscal year.

interest collected by a company should be credited to this account in the month when collected.

The method of accounting for the interest disbursed on registered bonds, so far as the financial officer of a company is concerned, is very simple compared to the best methods that have been devised for recording the payment of interest on coupon bonds.

In the former case the financial officer makes a certified statement of his disbursements for this purpose, and the accounting officer, after satisfying himself as to the authenticity of the statement,* allows the necessary credits.

The best method of accounting for the interest paid on coupon bonds, that I have noticed, is as follows: When a coupon is paid, the officer paying it cancels it by punching it at least twice. This prevents the possibility of its re-appearance upon the street.

As a rule the coupons of a company reach its financial officer through the various local banks and collecting agencies. All the coupons presented by each party or agent are, after cancellation, enclosed in a separate envelope, and upon the face of this envelope is written the name of the payee, the date of payment, the names of the mortgages from which the coupons are detached, the number of coupons presented for each mort-

*In many cases he has countersigned the checks with which the interest was paid.

gage, the gross amount of such coupons, and finally, the total amount paid. A history of each transaction is thus preserved temporarily in its original entirety for reference. This information, as may readily be supposed, is invaluable in adjusting accounts, verifying payments, and satisfying inquiries.

After payment is made, all the envelopes containing coupons, together with a detailed statement of the same, are turned over by the financial agent to the accounting officer for examination and record. Upon their receipt the latter officer proceeds to verify the contents of the different packages, and satisfy himself of the correctness of the accompanying statement in which the aggregate payment is given. The foregoing facts being determined he proceeds to file away the various coupons received.

The manner in which the coupons are filed away is at once simple and ingenious. A record book is provided for the coupons of each class of bonds: The filling upon the back of the book specifies the name of the mortgage: The first page corresponds to bond No. 1, the second page to bond No. 2, and so on through the book. The amount of the bond is specified at the head of the page. Each page is divided into as many squares, or blanks, as there are coupons attached to the bond; the blanks also correspond in size to the coupons. Each blank is numbered, and if the

bond has fifty years to run, and the interest upon it is payable semi-annually, there are one hundred blanks provided, two for each year. The coupon first maturing is pasted in blank No. 1; the second in blank No. 2, and so on. The blanks in the book that are unoccupied represent at a glance the coupons that are outstanding. The aggregate of these outstanding coupons is the amount of the company's liability for unpaid interest on its past due coupons. It is thus not only easy to ascertain precisely the aggregate liability, but it can be determined readily for the different classes of coupons.

The plan described of auditing coupons is at once simple, economical, and effective. The financial officer delivers up the cancelled coupons before receiving credit for their payment. After his accounts are verified the cancelled coupons are placed on file by the accounting officer, in the manner described, and with such form and system that reference can be made in an instant to any particular coupon that has been paid.

Under this method of accounting, any attempt to foist a spurious coupon upon a company could not possibly remain undetected, no matter how perfectly the counterfeit may be executed, for the reason that when the time came for filing it away in the record book the person performing this duty would find that the place allotted to that particular coupon was already filled; or, if the

spurious coupon were paid before the genuine, then it would occupy the place of the latter in the file. In either case the counterfeit would quickly be detected.

The foregoing method of accounting, I feel assured, affords, in the multitude of checks it enforces, the maximum amount of security that is attainable at the least possible cost to the railway company.

CHAPTER XXIX.

Rental of Leased Roads — Diversity in the Conditions of Leases — Circumstances that Affect the Rental — The Basis of Rental — General Character of Agreements — Rental Charges Analagous to Interest and Dividends on Capital — Method of Accounting for Rentals Paid — Rental Charges for Leased Roads should not be Confused with Operating Expenses, or with the Amount Disbursed for the Use or Rent of Isolated Buildings, Offices, Docks, etc.

The same diversity that characterises the ordinary operations of railway companies is discernible in the details that mark the leases made by them wherever the control of the property they own passes either wholly or partly into the care of other companies. An accurate description of the process by which these conveyances are made is impossible. The motive for the lease finds, as a rule, no expression in its provisions, and the consideration allowed is dependent upon innumerable contingencies. The transfer may be, and is, usually, suggested by the peculiar and exceptional value that the property has to the lessee; sometimes the inability of the lessor to manage it advantageously suggests the transfer. In many cases leases are perfected before the work of con-

structing the property has been commenced; this is very likely to be the case when the contemplated road is an extension or branch of a leased line, and is built by the lessors of such line. Leases are sometimes precipitated by the determination of the lessee to come into possession of a property lest it should fall into the hands of a rival enterprise; in such cases the value of the property acquired is of course of a negative rather than of a positive character to the lessee. But whatever the basis of the agreement may be, the best attainable interests of the parties attached to it are manifest in its spirit, and find expression in its carefully worded provisions.

The basis and the manner of paying rentals in the case of leased lines is also varying. Sometimes a definite and fixed sum per annum is named in the instrument, but more frequently, perhaps, the amount of the rental is made dependent upon the earnings of the property, the basis of such earnings* being carefully set forth in the lease. Sometimes, though rarely, the amount of rental to be paid is based on the number of passengers and tons of freight transported. I have heard of a case where the rent paid was based on the earnings per train mile.

But whatever the basis of rental may be, the stipulations of the instrument fixes the period the lease shall run, the time and manner of paying

*Schedules of rates, tables of divisions of earnings, etc., etc.

rent, the place where it shall be paid, and such other particulars as may seem necessary and proper to the parties interested.

As the value of a road is largely dependent on the fidelity and skill exercised in its management, the obligation of the lessee to operate it in such manner as to secure the best attainable results, and at the same time preserve the property intact and in good, serviceable condition, and, whenever necessary, add to its extent and facilities, is set forth in the instrument at great length, the method of administration that shall animate the enterprise, being, so far as possible, carefully and minutely described.*

Arbitrators are usually provided for, in case differences occur between the parties to the instrument, the manner of their appointment and the rules that shall govern their action being specifically set forth.

*I find the following in reference to this particular phase of the subject, in an old lease: "And the lessee agrees that at all times during the existence of this agreement he will faithfully maintain and efficiently operate said railroad, and keep the same in good repair and condition, with appurtenances and incidents * * * furnish and supply at all times a sufficient and ample amount of motive power, and passenger and freight and other cars, to do advantageously and in a proper manner all the freight and passenger business which may be offered or procured for said road, and which may be secured to the said line * * * and will in all ways furnish all needful and proper facilities for the increasing business of said line, and the growing demands of the country by its increasing production, or by the extension of said railroad communication; and will further adopt such judicious and efficient measures as may tend to make the said line a main and prosperous line; the lessee further agrees that during the term hereby granted, he will operate, maintain, and keep in repair the said demised premises, pay all taxes assessed upon it, and indemnify and save harmless the said lessor against and from all costs, expenses, and damages growing out of the maintaining, repairing, operating, and using the said road."

The lessee of a property is usually placed under obligations to make such full and correct returns of the earnings and affairs of the property as may be rendered necessary by the requirements of the lease, the lessors to have at all times free access to the books and accounts of the lessee.

The instrument of conveyance is also at great pains to fix the obligation of the lessor to maintain the legal organization of the property leased,* and otherwise maintain the lessee in peaceful possession of the enterprise, pay all liens and incumbrances thereon and the expenses incident thereto.†

The amount disbursed by railway companies for the use of property hired or leased is usually embraced in their profit and loss account under the head of "*Rental of Leased Lines.*" This heading is generally understood to include only railroad property that is leased; amounts paid for the use of another company's track, or its proper-

* "And the lessors hereby covenant and agree that they will, during the term in which the provisions of this indenture shall be in force, preserve and continue the legal organization of said leased road; will hold meetings, keep records, pass votes, and appoint officers, so far as necessary to enable the lessees to carry into full force and effect the objects of this instrument; and that they will give such further assurances as may be necessary therefor, and that they will at any and all times hereafter, when thereunto requested by the lessees, use their corporate powers, and do and perform in their own corporate name, any and all acts and things that may be necessary fully to protect said lessees in the full enjoyment of all the rights and privileges herein granted."—*Extract from old lease.*

† "And the lessors further covenant and agree, that they will at all times protect the lessees in the quiet possession and enjoyment of the premises and rights hereby granted, or intended so to do, on said line of —— miles, and will assume and pay all liens and incumbrances at any time found to exist thereon, with all costs, damages, and legal charges by reason thereof.'—*Old lease.*

ty in its entirety. Petty disbursements for the use of isolated offices, buildings, docks, lands, and kindred transactions, are commonly and very properly embraced in the returns as an operating expense.

Where a road is leased by a company, the amount paid as rental may be said to approximate a fair rate of interest on the value of the property, and the amount so paid is of the same character, so far as the accounts of the lessee are concerned, as the interest paid by it on its bonds or shares.

If the property operated by a company is owned by it, the returns on its cost appear on its books and in its report under the head of interest and dividends; where the property is leased the amount of rental paid by the lessee takes the place of such interest and dividends in its statements; hence the impropriety of the lessee including payments of this kind as operating expenses or cost of working the property.

In the accounts of the lessor the rental appears as the receipts from the rent of the property, and the amounts disbursed by such company for interest and dividends appear as in other cases where a company owns property and operates it.

METHOD OF ACCOUNTING.

The amount of the rental for leased lines should appear upon the books of railway compa-

nies, and in their profit and loss statement for the month in which it accrues, under the head of *Rental of Leased Lines.* In the case of the lessee it would appear as a charge; in the case of a lessor it would appear as a credit.

CHAPTER XXX.

Capital Stock of Railways — What it is and How it is Represented — Improper use of the Term Capital Stock — How Railway Property is Represented in Other Countries — Capital and Cost held to be Synonymous — Certificates of Shares — What They are — Laws Prohibiting an Increased Issue of Share Capital — The Rights of Shareholders in the Net Income of a Property — The Corporate and Organic Rights of Shareholders — The Amount and Productiveness of Share Capital in the United States — The Average Dividend — Stock Dividends — What They are and What They are for — The Occasion that Gave Them Birth — Par Value of Shares — Classes of Shares — The Form of a Certificate or Share Described — Rights of Preferred Shareholders — Declaration of Dividends — The Preliminary Notice Given — The Closing of the Books — Transfers of Shares — The Form of the Transfer — The Form of the Assignment of Shares — The Stock Ledger — How it is Kept — Notice of the Closing of Stock Books — The Form Observed — The Stock Books Closed Before the Meetings of Shareholders — Period for which Books are Closed — Method of Accounting for Dividends on Stocks.

The total cost of a company's property, including the working supplies required in its operation, constitutes its capital stock. In the United States this stock is represented by mortgage bonds, and by what we call capital stock (shares capital); but the latter represents, in reality, only a fraction of the capital stock.

Whatever the cost of a property may be in excess of its bonds and shares, may be called its unrepresented capital; it is still a part of the stock of the company.

It will thus be seen that the use of the term capital stock by us is plainly improper, and misleading when applied distinctively to a class of securities that represent only a part of the cost of an enterprise.

In other countries the cost of railroads is represented almost wholly by certificates of shares in the capital stock. They have nothing, so far as I know, that exactly corresponds to the mortgages on our railroads, although the debenture stock of the English companies has many features in common with it; stock of this character, however, is generally a perpetual lien upon the property it represents, while our mortgages have, at best, but a few years to run. The debenture stock of the English companies takes preference over all other classes of stock, and in many respects enjoys rights similar to our chattel mortgages.

In other countries we hear people speak of the capital stock of railways, never of their cost. The former implies the latter, or is synonymous with it. Here, however, when we speak of the capital stock of a railroad, we are generally understood to refer only to its outstanding or authorized issue of certificates of shares in its capital stock. We

have thus partially perverted the meaning of the phrase.

Reverting to the true meaning of the term then, every company is, or should be, empowered to cause its capital stock to be represented whenever it sees fit, either with interest bearing bonds or with certificates of shares.* Any excess of the cost of a property over such representative issues should stand upon the books under the head of Capital Account until such time as the proprietors see proper to give it expression and life.

Much of the money invested in our railroads is not now represented either by bonds or shares, and in some sections of the country the local regulations prohibit any further issue of certificates of capital stock lest the producers be taxed by the railway companies to pay profits on fictitious values; it being the conviction, apparently, of the authors of the regulations in question that the railroad companies would furnish gratuitous accommodation in the event they were prohibited from further capitalizing their permanent investments; these regulations may be said to be a fair illustration of the itch our people possess for managing every thing, and more especially the property of others, through the agency of some legislative enactment.

Whatever a railroad may earn over and above

*The English speak of the obligations of governments as *Stocks*; the securities of railroads are referred to as *Shares*.

the fixed charges upon it for interest, operating expenses, rentals and other accounts, if any, embraced under the head of profit and loss, is properly applicable for the purpose of dividends on shares in its capital stock. This surplus belongs of right to the owners of such shares, and should be equitably apportioned among them; This division of profits may be, and is, frequently, delayed; in some instances it never occurs, but while the immediate division of the profits of an enterprise is not always practicable or best for the interest of the proprietors, still any surplus that may be withheld by the management of a company as a working fund for use in building up the property, or otherwise, should be viewed in the light of a forced loan, a loan not to be subsequently ignored or covered up in the accounts, but to be repaid to the stockholder the same as if it were a note or other obligation, so soon as the exigencies of business will permit. Any other course is a perversion of the true principles of business, and is fraught with mischief.

A majority of the shares in the capital stock of a property elect its directors, and through them control its operations absolutely, so long as the company pays its fixed charges. In the event of the foreclosure and sale of a property the shareholders, (who are the company,)possess the right of redemption, but in the event this right is not exercised by them, their security becomes invalid.

The par value of the shares in the capital stock of our railroads, sold for the purpose of providing the means necessary to build such roads, amounts to $2,292,257,877.* Upon much of this capital no dividends have ever been paid; upon much of it no dividends are likely to be paid during the lifetime, at least, of the present generation. The dividends declared in 1878 amounted to $53,629,368,† and while they constituted 11 68-100 per cent. of the total disbursements of the railroad companies, they amounted in the aggregate to only 2 1-2 per cent. on the capital stock represented by certificates of shares.

I have no means of ascertaining what proportion of the dividends of 1878 was paid in cash, and what proportion was paid by new issues of certificates. In reference to the latter, and in explanation, it is proper to say that it has long been a favorite practice with our companies, a practice born of poverty and poor credit, to use their surplus earnings in improving and extending their property; the amount so expended being afterwards capitalized by turning over a corresponding amount of certificates of shares to the stockholders in lieu of cash. The amount thus divided is termed a stock dividend.

The par value of a share of capital stock in a

*Poor's Manual, 1878, p. vii.

†*Ibid* p. vii.

railroad is usually $100;* but in some cases the capital stock is divided up into shares of $50 each.† In many cases two kinds of shares are issued, and while their form is generally alike,‡ they do not both occupy the same rights and privileges. The higher grade of securities of this kind we denominate Preferred Stock; the subordinate grade as Common Stock.‖

The rights these shares severally enjoy, and the maximum amount of each that may be issued,

*Thus that part of the cost of the New York Central and Hudson River R. R. that is represented by certificates of shares, amounting to $89,428,300, is represented by 894,283 shares.

†The stock of the Pennsylvania R. R. Co. is thus divided.

‡FORM OF CERTIFICATE OF CAPITAL STOCK
(100 SHARES.)

(No. 980.) PREFERRED. (100 Shares.)

CAPITAL STOCK. SHARES, $100 EACH.

MINNEAPOLIS & SOUTH PACIFIC RAILROAD CO.

STATE OF MINNESOTA.

THIS CERTIFIES that JOHN DOE is the owner of ONE HUNDRED Shares of the Preferred Capital Stock of the Minneapolis & South Pacific Railroad Company, transferable on the books of the Company on surrender of this certificate.
WITNESS the signature of the President and Secretary.
Dated April 19, 1880.
H. A. GRAY, Secretary. RICHARD ROE, President.

The certificates for common shares are similar to the above, except that the word Common is substituted for Preferred.

‖In Great Britain and in its provinces they are usually designated respectively as Preferential and Ordinary shares.

is carefully set forth in the articles of incorporation of a company, and this limit can not subsequently be exceeded, under any circumstances, without the formal consent of the holders.

Where a company has two or more classes of shares,* the relation they sustain to each other and to the property is determined and fixed by the peculiar circumstances of the case that first suggested the diversity of interest.† The rights, consequently, that are enjoyed by the holders of preferred and common shares, on different roads, are rarely, if ever, exactly the same.‡

Where two classes of stock are in existence, the superior rights of the holders of the preferred stock extend usually no further than the division of the net earnings; in other words, while the holders of the preferred shares are entitled to a

*The Grand Trunk Railway Co. of Canada has five classes of stock, viz: Ordinary Stock; Ordinary Stock, new issue of 1873; First Preference; Second Preference; and Third Preference. It has, besides, various kinds and grades of bonds.

†When a company in poor credit is compelled to raise money, the best terms attainable are accepted by the shareholders; sometimes, in such cases, mortgage bonds are created; in some cases new shares are issued, which shares are, in some instances, by consent of the holders of the existing securities, allowed to take precedence; in ways such as these the different classes of shares that we have were first brought into existence.

‡The Chicago, Milwaukee and St. Paul Company's preferred shareholders are entitled to an annual dividend of seven per cent. before a dividend can be paid on the common shares. The preferred shares of the Lake Shore and Michigan Southern R. R. (which amount to only $533,500) are entitled to an annual dividend of ten per cent on their par value before the ordinary shares, amounting to about fifty millions of dollars, can receive any return. No dividend can be paid on the common shares of the North Western road during any year, out of the receipts of such year, until seven per cent. has been divided among the holders of the preferred shares. Other differences, still more glaring, appear when we come to examine into the relation the two kinds of shares sustain to each other on different roads.

certain return upon their investment before the owners of an inferior class of shares can receive any thing, still, in the event the property is foreclosed or sold, any surplus there may be, after satisfying the mortgage bonds and other debts of the company, is divided equally among the shareholders without reference to the class they belong to. In some cases, however, the rights of the preferred shareholders extend to the sale or division of the property; or, in other words, the holders of the preferential shares must first be paid in full before the holders of the common shares can receive any thing in the event the property is sold.

Railway dividends are declared by the boards of directors of the companies interested. The meeting at which a dividend is declared must be legally convened,* and must in all respects conform to the company's By-Laws and the statutes, if any, made and provided. The amount of the contemplated dividend being fixed by the board, it declares how it shall be paid,† and when. It also fixes the date when the books in which transfers of stock are recorded shall be closed, and when they are to be re-opened.‡ Dividends are paid to the persons who appear upon the

*Usually a week's notice must be given by the Secretary of a meeting of the Directors; when, however all the Directors are present, this formality can be dispensed with.

†Whether in cash, in shares, or in bonds.

‡For form of Stock Transfer book, for which I am indebted to Mr. S. O Howe, see appendix "C," Volume II.

Stock Ledger as the owners of the shares at the time the books are closed.*

There is usually a period averaging from ten to thirty days between the declaration of a dividend and the closing of the books of a company. The holders of the shares of the company take advantage of this period to present, for transfer, at the office of the company, the certificates which they own or hold which are drawn and registered in the name of the original owners; on the presentation of these certificates they receive others drawn in the name of such person or persons as they desire.† A considerable period of time is also required to enable the officers of a company to make the transfer entries upon the stock books which are precipitated by the declaration of a dividend. They also require time to prepare for the payment of the dividend when due, which date corresponds generally to the date fixed for re-opening the books.

The great bulk of the certificates of shares in the capital stock of a railroad pass from one hand to another without transfer on the books of the company,‡ the original holder of the certificate signing in each instance the blank power of attorney printed on the back of the form. This

*I am indebted to Mr. J. B. Redfield for the admirable form of stock ledger which will be found in appendix "C," Volume II.

†The bulk of the speculative shares of this country stand in the name of brokers and other agents of the principals.

‡This is particularly so with speculative securities.

power of attorney, which he signs, authorizes the holder of the certificate to secure its transfer upon the books of the company interested at his pleasure by simply inserting in the place provided, the name of the person in whose name it is desired to have the stock appear.*

On the eve of closing the books for a dividend or a meeting of stockholders, the certificates that have been floating in the various markets of the country are brought in by the owners or their attorneys and exchanged for other certificates made in the name of the present holders or their agents. From the certificates thus brought in the transfer entries are subsequently made upon the stock books during the period that elapses between the closing and the re-opening of the same. During the period that the books are closed the officers of the company also avail themselves of the opportunity to make drafts for the amount of the dividend that has been declared, the drafts being

*_Form of Transfer and power of attorney printed on back of certificate of stock, for which I am indebted to Mr. S. O. Howe._

For Value Received ..... do hereby sell, transfer and assign to..... ..... the within mentioned Shares of Stock, and do hereby constitute and appoint..... ..... as.....Attorney, irrevocable, to transfer said stock on the Books of the within named Company, and to make and execute all necessary acts of assignment and transfer required by the regulations and by-laws of said Company either in person or by such other Attorney or Attorneys as..... may appoint or substitute for that purpose.

Witness.....hand and seal this..... day of ..... 18.....

JAMES JONES.

Signed and Delivered in presence of
(*Thos. Robinson.*)

drawn usually to the order of the persons in whose names the shares appear.*

Railway companies are required, in all cases, to give timely public notice of the payment of dividends and of all meetings of stockholders. They are not permitted to close their stock books without giving suitable public notice in advance, specifying the date the books will be closed, and when they will be re-opened, and the reasons why they are closed.†

A period of from five to fifteen days generally elapses between the closing and the re-opening of the books for a dividend. When closed for the annual meeting of stockholders, from thirty to forty days is allowed. During the time the books are closed no transfers of shares can be made thereon.

The stock books of a company are closed preparatory to its meeting of shareholders, so that, among other things, a correct list of the holders who are legally entitled to vote may be made by

*These drafts are generally countersigned by an accounting officer of the company, and thus a necessary and valuable check is secured upon the disbursing agent, and the reports rendered by him.

†USUAL FORM OF NOTICE.

'CHICAGO AND NORTH-WESTERN RAILWAY COMPANY,

"NEW YORK, April 24, 1879.

"The Annual Meeting of the Stockholders and Bondholders of this "Company, for the election of Directors, pursuant to law, and for the trans-"action of such other business as may come before said meeting, will be "held at the office of the Company, in Chicago, on Thursday, June 5, next, at "1 o'clock P.M. Transfer-books close April 30 and re-open June 9. Bond-"holders will authenticate their voting bonds by registration.

"M. L. SYKES, Vice-President and Secretary."

Advertisement in New York paper.

the proper officers of the company. Each share of stock entitles the person in whose name it is registered, when the books are closed, to one vote at the contemplated meeting of stockholders, or at any adjourned meeting thereof.

METHOD OF ACCOUNTING.

The dividends of a company constitute a separate entry upon its books and in its profit and loss account. They are charged under the head of "*Dividends on Stock*" in the month on which they are declared, and appear in the returns for that month, the date of payment not being material so far as the accounts are concerned. Pending the payment of dividends, they should appear as a liability under the head of "*Unpaid Dividends.*"

CHAPTER XXXI.

Sinking Funds — Prevalent Ignorance in Regard to Them — The Term not Self-Explanatory — What a Sinking Fund is — The Trustee, his Discretion, his Duties, and Responsibilities — Differences that Exist in Reference to the Treatment of Sinking Funds — The Payment of Sinking Funds with Uncancelled Interest Bearing Bonds the Best Method for the Security of Investors. — The Rules that Should be Observed in Order to Secure Faithful Accounting on the Part of the Trustee — Trustees Should Give Proper Guarantees for Cash and Uncancelled Securities in Their Possession — The Payment of Sinking Funds With Cancelled Bonds the Most Equitable — A Sinking Fund in the Nature of Unrepresented Capital — It is Not a Proper Charge Against Income — The Method of Accounting that Should be Followed — The Different Accounts that Should be Opened to Enable us to Understand the Status of Particular Sinking Funds.

A large number of very intelligent people, indeed I think I may say the majority of intelligent people, possess exceedingly vague ideas as to what constitutes a Sinking Fund. Many people who are otherwise attentive to every thing that transpires around them, refuse to consider the term at all, when they meet it in print, skipping it in hot haste as they would jump over a weak spot in the ice; they look upon it as an

enigma of finance that it is only given a few favored mortals to fully understand. Webster, in his definition of the verb *sink*, says, among other things, that it is

"To cause to sink; to put under water: to immerse in water, as to sink a ship; to depress; to make by digging or delving, as, to sink a pit or well."

This explanation, though particularly lucid, affords us no clue to the meaning of the term "Sinking Fund." Evidently we must look elsewhere for light. In pursuing my inquiries on the subject, I have found, floating through the minds of a great many people, and especially very young people, the strangest imaginable notions in reference to the meaning of the term. Their ideas on the subject, I found, without exception, to have reached the nebulous state only, the period of transition. To this class, I discovered, a sinking fund was a sort of a well or safe sunk in the ground, in which a fund was mysteriously placed; of the location of the well or concealed safe, they did not inquire. In the contemplation of problems of this character, the minds of young people act slowly and laboriously, like large bodies of matter just getting under way.

The object or purpose to be secured in sinking this fund I found not to be apparent to them: A vague curiosity sometimes seemed to take possession of them to know more about the matter: What, for instance, they were led to inquire, are the ceremonies attending the interment or sinking of the

fund? What is the length of time it lies buried? What is the date of its final resurrection? What is the process? Why is it sunk, anyway? These inquiries are pregnant with curious interest to them, but there being usually no dictionary at hand, or other convenient source of information to which they can go for enlightenment, the mind of the inquirer reacts upon itself, and thus a contemptuous indifference succeeds the active state of inquiry we have noticed.

Now, it is our purpose in writing this chapter, to do what we can to enlighten such as are in darkness on the nature of a sinking fund, and particularly the sinking funds incident to the operation of railroads.

And we may premise our statement by saying that a sinking fund is something set apart for a particular purpose. It does not necessarily consist of money. We will suppose that a government or railroad company has a certain amount of bonds of a particular class that will become due at a specified time in the future; to insure the payment of these bonds at maturity, a certain sum is laid aside by the government or the railway company annually, or semi-annually, as may be provided. This sum can be used in the payment of the bonds specified, and for no other purpose. The sum thus laid away is called a sinking fund. Webster describes a sinking fund as:

"A sum of money set apart, usually at fixed intervals, to the redemption of the debts of government or of a corporation."

The person entrusted with the custody of this fund is called the Trustee of the Sinking Fund. Sometimes there are two or more trustees.* Sometimes a banking house is made the trustee of the fund.

The value of the security for which a sinking fund is provided is dependent somewhat, as may readily be supposed, upon the character of the trustee. His discretion is large; he may rigidly enforce the provisions of the instrument or he may ignore them. No penalty attaches to him personally for neglecting to act. He is a power unto himself.

The holders of a security, for which a sinking fund is provided, may, to be sure, call upon the trustee of such sinking fund to ascertain if the requirements of the trust are complied with, and in the event they are not, they may, it is possible, be able to compel him, by process of law, to enforce its requirements or resign his office, but this is rarely, if ever done. People who think about such things at all take it for granted usually that the trustee is performing the functions of his office.

Another phase of the subject presents itself. When a sinking fund is payable in cash, as it is in the majority of cases, what is to prevent the trustee from appropriating the amount to his own

*Provision is usually made in the instrument creating the sinking fund, for the appointment of trustees in the event those specifically named die or cease to act.

use if he feels so inclined? His honesty; he rarely, if ever, gives bond of any kind. Such being the case, the importance of using care in selecting a trustee becomes doubly apparent.

Sometimes, though rarely, no provision is made in a mortgage for the creation of a sinking fund; as a rule, however, where the amount is large, the most careful forethought is exercised in preparing a mortgage to protect in this way the holders of the contemplated bonds. Under all ordinary circumstances the creation of a sinking fund is very properly esteemed imperative by investors.

The object sought in creating a sinking fund is to strengthen the security, to insure all the obligations of the mortgage, including the payment of its interest and principal when due. To insure this the railway company binds itself to place a specified sum at fixed periods in the hands of a person or persons named in the instrument as trustee. Sometimes these payments are in cash; sometimes it is agreed that in lieu of cash an amount of bonds (of the issue for which the fund is created) corresponding to the cash obligation ordinarily required shall be purchased by the company and deposited in the sinking fund; sometimes the purchase of the bonds is left to the trustee. Sometimes provision is made for cancelling the bonds in the hands of the trustee; at other times they are left with him without cancellation.

In case uncancelled bonds are deposited, the provisions of the mortgage usually require that the interest on such bonds shall continue to be paid the same as if they were still outstanding in the hands of the original holders. When interest is paid in this way it is usually obligatory on the part of the trustee to use such interest installments in purchasing in the market still other bonds of the same issue, or in the event this can not be done within prescribed limits, then other securities are purchased with it or the money remains in his hands, as may be provided for by the instrument creating the sinking fund. Whatever amount the trustee of a sinking fund may have in his hands at the time the bonds mature is used by him or under his direction in the payment and cancellation of such bonds; if the requirements of the sinking fund have been satisfied with bonds such bonds are destroyed by him at the expiration of the trust.

So far as the security of the holders of the security are concerned it is manifest that the plan requiring uncancelled bonds to be deposited with the trustee, the payment of the interest on which shall continue during the existence of the fund, affords the greatest security to the investor.

To prevent any improper use of the bonds deposited with the trustee the fact that they are held by him in trust should, however, be plainly indicated upon their face.

Sinking funds should never be paid in cash. Either the bonds for which the fund is created should be purchased and deposited with the trustee, or in the event that is impossible then government securities or other securities of the company interested should be deposited with him.

In many cases it is provided that in the event sufficient bonds can not be purchased to satisfy the sinking fund at a specified price the company may draw by lot the number of bonds required, the holders of such bonds being compelled to deliver the same to the trustee at a rate stipulated in the instrument. This plan seems to be a very good one and entirely fair in its operations.

Of the methods we have described, that which requires the cancellation of bonds at the time they are deposited with the trustee seems in all respects the most equitable. Every bond cancelled increases by so much the security of those still outstanding; and, under ordinary circumstances, this is sufficient, and (except in those cases where the value of the property is dependent upon contingencies impossible to determine) should satisfy holders. When a doubt exists, however, as to the future value of a property, the holders of its bonds are justified in insisting upon such additional measures being provided for the final extinction of its debt as may seem to them necessary and proper.

But whatever method may be adopted, it

seems both necessary and right that the trustee should afford the holders proper guarantees for the cash and securities that may come into his hands.

A SINKING FUND IS IN THE NATURE OF UNREPRESENTED CAPITAL.

When any obligation of a company that properly represents its cost is retired, it clearly has the right to re-issue the same whenever it sees fit.

The amount paid by a company into its sinking funds has for its purpose the cancellation of such outstanding obligations, and the amount so paid becomes, consequently, a part of its unrepresented stock, and should be held in abeyance until fully capitalized.

Sinking fund installments, do not, therefore, it seems to me, in any proper sense appear as a just charge against the net income of a property, and, if this is so, they should not be embraced in its profit and loss account.

When bonds are retired and cancelled, either by payments into a sinking fund or otherwise, it is clearly the right and privilege of the company retiring and cancelling the same, to re-capitalize them at its pleasure.

METHOD OF ACCOUNTING.

If this is so, charges for sinking funds should

not be embodied in the income account of a company.

When a sinking fund installment becomes due, then the amount of such installment should appear upon the books and in the accounts, under the head of liabilities, as "*Past Due Sinking Fund Installments.*" In such cases a distinct and separate debit account should be opened with the same upon the books and in the accounts, to be known as "*Unpaid Sinking Fund Installments.*" Both of these items disappear from the returns with the payment of the installment.

When cash is paid into a sinking fund, or when uncancelled bonds are paid into a sinking fund, the amount of such cash or bonds should be entered upon the books and embraced in the accounts as an asset, under the head of "*Amount Deposited with Trustee of Sinking Fund.*" When bonds that are paid into a sinking fund remain uncancelled, then such bonds should appear upon the credit side of the books and in the accounts, as "*Bonds in the Hands of Trustee of Sinking Fund;*" being withdrawn (transferred) in the exhibit of the company from the amount of bonds outstanding.

When bonds paid into a sinking fund are cancelled, the outstanding bonds should be reduced upon the books and in the accounts by a corresponding amount, and no cancelled bond of a company, whether in the sinking fund or else-

where, should be embraced as an asset or liability upon the books or in the accounts.

When a company desires to recapitalize bonds that have been purchased for the sinking fund and cancelled, the process, so far as the accounts are concerned, is the same as when the securities were first issued, viz.: the amount of the bonds or stocks issued are credited as outstanding, cash being charged with the proceeds of the same. When sinking funds are paid with cash or uncancelled bonds, the amount of such cash or bonds appears, as described above, as a debit, until the obligation for which the sinking fund is credited is finally retired. When this event transpires, the "*Amount Deposited with Trustee of Sinking Fund*" is credited, and "*Bonds in the Hands of Trustee of Sinking Fund*" is charged; or, if the installment was paid with cash, then bonds outstanding would be charged. These entries close the different accounts, the same as if the sinking fund had been paid in the first place with cancelled bonds, and the process of recapitalization is the same as that described above.

END OF VOLUME ONE.

APPENDIX "A."

CLASSIFICATION OF THE OFFICERS AND OPERATIVES OF RAILWAY COMPANIES.

It will be considered by the great bulk of those actively connected with our railway companies, that in preparing a classification of the operatives of railroads, we have performed a work of supererogation. While this is doubtless true in many respects, still our list will serve as a brief, and in many respects admirable illustration of the extent and prolix character of the service. Aside however, from this particular aspect of the subject, I confess personally to have felt a desire for more definite knowledge in reference to the different classes of railway operatives; hence the list which has been picked out with infinite labor and patience, from time to time as leisure and the different titles suggested themselves. The list is doubtless still incomplete in many important respects, or at least I believe it to be so, for the reason that I have never been able to go over it without discovering some omission or apparent inaccuracy.

While I knew generally that such and such offices or departments of service existed upon our railroads, I did not know their number, and upon actual investigation I find their extent

and variety to be much greater than I had supposed; while I knew that the number of men having specific duties of a peculiar character to perform was very great, I did not imagine it to be as great as this investigation shows it to be.

In the preparation of the accompanying list, it is possible that there has in some cases been included under different designations men performing substantially the same labors. Such instances, however, if they occur are unimportant, and not to be compared in number or consideration to the different classes of employes connected with the general and departmental offices of railroads who perform duties of a special character, that it is impossible from their peculiar and complex nature to describe or embrace in a schedule of this kind.

From this list it appears that there are some three hundred and thirty classes of service in connection with the force employed on a railroad. In each of these classes the employe, it must be remembered, is required to possess a knowledge of a more or less technical character, otherwise he can not perform the services incident to his office in a satisfactory manner. This special knowledge which he must possess varies in its extent and value from that required of a general manager down to that entertained by a warehouse laborer.

In some of the departments of labor requiring skill of a high order, such as that possessed by locomotive drivers, the number of employes is very

large, while the number employed in other departments, requiring an equal or even greater degree of skill, such as that possessed by the civil engineer and his assistants, is comparatively very small.

The actual number of employes in the service of a company, as every body knows, is regulated by the extent of its property and the amount of its traffic, hence the manifest impossibility of attempting to determine from our list or otherwise the number of operatives of the various classes that a company will be compelled to keep in its service, without we know the particulars governing its operations; upon small properties the duties in connection with many of the offices that have separate designations on our list will be performed by one and the same person.*

In determining the title by which to designate the different classes of officers and operatives we have endeavored to select those generally in use, but the diversity that exists in this respect upon different roads and in different sections of the country has prevented our work being as satisfactory in this particular as we could wish. However this diversity, great as it is, among our own companies, seems to be very trifling indeed, compared to the diversity that exists between the titles that are in use in the United States and

*Thus on the Sycamore and Cortland road (8 miles long), a half a dozen active and versatile men perform the duties that would on a larger road be equitably divided between all the various offices that we have given.

those that are current in England and Scotland; while different companies in the Union have in many cases different designations for many of their operatives, still the dissimilarity that exists in this respect is not so great that we can not readily determine the peculiar class to which an operative belongs from the title or term used in designating him, but when we attempt in like manner to determine the status of an English or Scotch operative by his title, our effort is in many cases completely baulked. Many of the titles used in England and in America are indeed in no wise different, but the great majority of them have apparently nothing in common with each other. In each country the people largely adopted, with the introduction of the railroads, the titles and designations of various kinds in use prior to that time; these designations had, in the majority of cases, little or no connection with or natural adaptation for the new order of things, and the uses to which they were put, and it follows that, as the period of which we speak grows more and more distant, and people cease to remember the facts we refer to, or grow up in ignorance of them, they are greatly surprised at the apparent absurdity of many of the terms used. Thus, when an American reads in an English paper that the gangers, stokers, guards, plate-layers, shunters and pointsmen have presented Superintendent Skiggles with an address, the reader is fain to seek out

some one to the manner born, so to speak, for information as to the meaning of these mysterious titles. The titles used in the United States designating the different classes of operatives, no doubt sound equally absurd to English people and others.

In reference to the titles used in designating the officers and employes of a company, it is not a matter of any very great consequence, perhaps, what they are, so long as they possess the uniformity and comprehensiveness necessary to enable the public to readily understand their significance and relation to each other. Nevertheless, it has always seemed to me that many of our railway officials were at needless pains to restrict themselves in the selection of titles to those that were the least attractive, and when the title was a compound one, to so warp and disfigure as to make it almost unrecognizable.

Thus, for instance, it has always seemed to me that it would have been much more proper and seemly to have designated the General Manager of a railway corporation as its Manager General. Think of speaking of the Governor General of Victoria as the General Governor! And in the same way the General Solicitor would, it seems, much improve his appearance and dignity under the more sonorous title of Solicitor General. In this particular connection, who can think, for instance, without a shudder, of the impropriety,

not to say bad taste, of referring to the Attorney General of New York as the General Attorney of New York! In the same way, Mr. John Pendigrass, Jr., General Auditor of the Great South road, would much more properly be designated as Mr. John Pendigrass, Jr., Auditor General of the Great South road. Were this done, the Auditor Generals of our different States would instantly recognize in him a brother, and a fellow officer, to be respected and deferred to in his place. We might continue these interesting comparisons indefinitely, but we will close our reference to the subject here by the suggestion that in the amiable and generous strife for uniformity and improvement of every kind, so noticeable in connection with the so called railway problem in the United States, the matter of securing for our railway companies and the officers thereof, and the public generally, a carefully prepared, uniform, and acceptable list of titles for the officials and operatives. in charge of our roads, should not be overlooked or disregarded.

APPENDIX A.

(CONTINUED.)

CLASSIFICATION OF THE OFFICERS AND OPERATIVES OF RAILWAY COMPANIES.

Accountant
Accounting Officer
Agent, Claim
  Commercial
  Contracting
  Emigrant
  Freight
  Fuel
  General Baggage
    Freight
    Passenger
    Purchasing
    Ticket
  Land
  Lost Freight and Baggage
  Lumber
  News
  Passenger
  Right of Way
  Station
  Stock
  Ticket
  Tie
  Transfer
Auditor—Car Accounts
  Disbursements
  Freight Accounts
  Return Ticket Dep't
  Ticket Accounts
  Traveling
Axe-man (Engineering Corps)
Baggageman, Depot
  Stripper
  Train
Blacksmith
  Apprentice
  Helper
Boiler-maker
  Apprentice
  Helper
Boiler-washer
Bolt Cutter
Book Keeper
  General
Boy
Brakeman, Freight Train
  Gravel Train
Brakeman, Passenger Train
  Wood Train
Bricklayer
Bridge Tender
Cabinet Maker
Caller, Freight
Car Accountant
  Repairer
  Reporter
  Sealer
Carpenter
  Building and Bridge Dep't
  Car Dep't
  Locomotive Dep't
Cashier
  Freight Agencies
  Ticket Agencies
Cleaner, Car
  Fire Box
  Plush
Clerk
  Abstract, Freight
  Advanced Charges, Freight
  Boy
  Car
  Check, Freight
  Chief
    Accounting Officer's
    Car Accountant's
    Claim Agent's
    Freight Agent's
    General Freight Agent's
      Passenger Agent's
    Shop
    Ticket Agent's
  Corresponding
  Coupon Ticket (Foreign)
    (Local)
  Delivery
  Dock
  Earnings
  Freight Received
  Fuel
  Grain
  In Car
  Index
  In Freight

Clerk, Invoice
Junior
Labor, Distribution of
Locks and Seals on Cars
Locomotive
Lumber
Material
Distribution of
Notice (Arrival Freight)
Operating and Const. Acc'ts
Out Car
Freight
"Over" and "Short" Freight
Paymaster's
Pool
Rate
Roadmaster's
Shipping
Shop
Short Hand
Station
Statistical
Superintendent's
Supply
Tariff
Ticket
Way Bill
Examining
Weighing
Coal Heaver
Collector of Tickets on Train
Commissioner, Land
Pool
Tax
Comptroller
Conductor, Dining Car
Drawing Room Car
Freight Train
Gravel Train
Milk Cars
Passenger-Train
Sleeping Car
Wood Train
Cook
Boarding Car
Dining Car
Cooper at Freight House
Coppersmith
Apprentice
Helper
Core, Engine Maker
Cranesman (Steam Shovel)
Deliveryman
Depot Master
Despatcher, Engine
Train
Director
Acting
Executive
Draughtsman
Building and Bridge Dep't
Car Dep't
Engineering Dep't
Land Dep't
Locomotive Dep't
Driller
Engineer Civil
Locomotive
Stationary
Steam Shovel
Fireman, Locomotive
Stationary Engine
Steam Shovel
Flagman, Crossing
Engineering Corps
Flanger
Foreman
Blacksmith Shop
Boiler
Building and Bridge Dep't
Car Repairers
Construction Train
Engines on Road
Foundry
Freight Car Shops
Gravel Pit
In Freight House
Machine Shop
Machine Shop Erecting Floor
Out Freight House
Paint Shop
Passenger Car Shop
Pattern Shop
Quarry
Tin Shop
Tools
Track
Frame Maker
Gateman at Crossing
Hair Picker
Heater Blacksmith Shop
Foundry
Hostler
Inspector
Bridge and Culvert
Cars
Fuel
Iron
Locomotive
Lumber
Material
Tie
Track
Janitor
Laborer
Building and Bridge Dep't
Car Dep't
Common
Construction Train

Laborer, Elevator
Foundry
Freight House
Fuel
Gravel Train
Locomotive Dep't
Lumber Yard
Quarry
Rail Mill
Sand Shed
Station
Store House
Track
Turn Table
Lamp Lighter
Leveler, Engineering Corps
Locksmith
Machinist
Car Dep't
Apprentice
Helper
Locomotive Dep't
Apprentice
Helper
Rail Mill
Manager, Freight Traffic
General
Passenger Traffic
Traffic
Marker Engineering Corps
Mason
Stone
Tender
Master Car Builder
Mechanic
Painter
Messenger
Moulder
Nut Tapper
Oiler, Car Journal
Shafting
Painter
Building and Bridge Dep't
Car Dep't
Locomotive Dep't
Pattern Maker
Paymaster
Plumber
Policeman
Porter
Officers' Car
Parlor Car
Sleeping Car
Station
President
Vice
Pump Repairer
Punchman
Quarryman
Rivet Boy
Roadmaster
Rodman, Engineering Corps
Scalesman
Seamstress
Secretary
Vice
Sectionman
Slater
Stationer
Steam Fitter
Stevedore
Stone Cutter
Store Keeper *
Ticket
Superintendent Buildings and Brdg.
Car Dep't
Division
General
Locomotive
Machinery
Telegraph
Surgeon
Surveyor
Sweeper, Round House
Switchman
Switch Tender
Tallyman
Teamster
Ticket Collector
Gateman
Time Keeper
Tinsmith
Apprentice
Helper
Train-master
Transit-man, Engineering Corps
Treasurer
Local
Vice
Truckman
Truck Repairer
Upholsterer
Waiter
Warehouseman
Watchman
Bridge and Culvert
Car Dep't
Freight House
Locomotive Dep't
Passenger Depot
Rail Mill
Track
Yard
Weighmaster
Wheel Borer
Presser
Wiper, Locomotive
Wood Piler
Sawyer
Yardmaster

* In charge at depots of supply, of fuel, material, oil, etc.

APPENDIX "B."

LIST OF THE STANDARD SUPPLIES TO BE FOUND IN THE STORE-HOUSES AND DEPOTS OF RAILROAD COMPANIES.

The subjoined list of articles of merchandise numbers, it may be said, only those of a standard character that a company usually keeps on hand in its store-houses and depots of supply, for the purpose of working its road and making the repairs and renewals required from day to day, in the operations of its property. The articles that it manufactures from time to time from these goods, or that it purchases in the market for particular and exceptional purposes, as occasion arises, are not as a rule intended to be enumerated in this catalogue.

The articles of a special and exceptional nature that a company requires in connection with its daily operations are much more numerous and varied in their character than would be supposed by those who have not taken the trouble to investigate the subject. This is shown very pointedly in a recent volume,* explaining the terms used in connection with the construction of railroad cars. From information contained in this

* The Car Builder's Dictionary.

publication, it seems that there are in the neighborhood of fifteen hundred distinct and separately designated items or articles of merchandise used in connection with the cars of our railroad companies alone. Many of these articles, such as panels, brake-bars, sills, and ventilators, are manufactured from the raw material by the railroad companies as they are required for use; others again are purchased in the market only when needed, and in such amounts as may be necessary, while still others again, such as window glass, axles, wheels, coupling-bars, and other standard articles of a like nature, are purchased in quantities and kept in stock for use as occasion requires.

A railroad company has occasion to buy during every hour of its existence, many articles of a peculiar character to meet particular exigencies in connection with its operations; thus, to-day it will require a cook stove for its eating house, to-morrow wine for its dining car, the day following an organ for its drawing-room coach, and on the next day a chronometer for the office of its train-despatcher, or gas fixtures for one of its offices or waiting rooms. We might continue this list until we had filled a thousand pages and still embrace in our catalogue only the articles that are of prime necessity in connection with the active operation of a railroad; still the great bulk of the articles that we would name, are not associated with the supplies used by railroads in the same

sense that wood, coal, ties, rails and track fastenings are. While the exceptional articles used by a company may be said to be countless in number and infinite in their variety, the assortment of standard supplies that a company is compelled to keep on hand, is readily comprehended.

While, therefore, we may not attempt to make a list of what a company buys for its use, we yet may hope to present a substantially correct and useful list of the articles which it keeps in its depots of supply. This list, aside from the practical value it has, will also serve a useful purpose in affording us a clearer and more comprehensive understanding of the importance of railway companies as manufacturers and consumers, than could be secured without it.

As we have stated, a complete catalogue of the articles a company is compelled to purchase from time to time to meet all its varying wants, may be said to embrace substantially every thing that is sold in the most varied markets of the world; but the supplies it must keep on hand, however, according to its capacity and uses, to enable it to buy cheaply and otherwise operate its property prudently and economically are neither large nor difficult to describe, and while they are well known to those immediately associated with the responsibility of supplying the companies with what they want, they are not so well known to the officials of railway companies generally. It

is mainly for the information of this class that the accompanying list has been prepared, under the inspection of experts in such matters, for insertion here.

It would be interesting in connection with the operations of railroads and the subject of the supplies they require, and would add greatly, we may believe, to the interest of this appendix, if we could give the relative importance, as regards cost of the different articles used by railway companies; but this information, so far as we know, can not be determined from any data that is now accessible to us. In the application of the subject to particular properties, an investigation would without doubt demonstrate that an article of superior cost on one road would occupy only a secondary place upon another line, and thus the order of the list would vary throughout the country, according to the location of the roads and the necessities of the different companies. Generally speaking, however, the articles of greatest expense to the railway companies are, I think, undoubtedly, rails, coal, wood, cross-ties, wheels, (of different patterns,) track-splices, axles, (of different patterns,) fencing, track spikes, etc., etc., etc., in the order named.

APPENDIX B.

(CONTINUED.)

LIST OF THE SUPPLIES TO BE FOUND IN THE STORE HOUSES AND DEPOTS OF RAILROAD COMPANIES.

Acid, Muriatic and Oxalic
Advertising Boards
  Frames
Adzes, Carpenters
  Rail-Road
Alcohol
Ammonia
Antimony
Anvils
Aprons for Engines
Augers, Post Hole 6 to 12 in.
  Ship 9 - 16 to 2 in.
  Steel ½ to 3 in.
Automatic Lubricator
Awls, Brad
Axes, Broad
  Chopping
  Hand
Axles, Car
  Driving (Locomotive)
  Tender (Locomotive)
  Truck (Locomotive)
  Hand Car
  Push Car
Babbitt Metal
Bands, Spring
Bar Door Pulleys (for Warehouses)
Barn Door Rail (for Warehouses)
Barrels, Water
  Oil
Bars, Angle Track
  Claw
  Clinker
  Crow
  Lining
  Pinch
  Tamping
Basket Racks for Coaches
Baskets
  Waste paper
Bedding (for boarding, sleeping and other Cars)
Beeswax
Bell Cord Bushings
  Couplings
  Guides
  Hangers
  Pulleys
Bellows (Blacksmiths)
Bell Ringers (Steam)
Belting Leather Double, 4 to 20 in.
  Single, 1 to 12 in.
Belting Rubber
Bends, Return — Open and Close
Binders (Paper)
Bitt Braces
  Shanks (Machine)
Bitts, Auger
  Car
  Machine
Blank Books
  Cards
  Paper
Blanks (There are from 500 to 1500 different blanks, or forms, used in connection with the operations of a road.)
Blank Tablets
Blotters
Bolts, Berth
  Bridge
  Brass Flush (various sizes)
  Carriage (various sizes)
  Cellar
  Chain
  Door (various kinds)
  Drift
  Flush
  Iron Morticed
  Machine (various sizes)
  Neck
  Patch
  Sash
  Square (various sizes)
  Stove (various sizes)
  Track (Square and Hex nuts)

Bolts, Wedge
Wrought Iron (various sizes)
Bone Dust
Books
Copy (Impression)
Borax
Bottles (Sample and Shipping)
Boxes, Baggagemen's
Conductors' Check
Fuel Ticket
Letter
Tank End
Tank Side
(Tin) various patterns
Trackmen's tool
Train
Brick, Arch 18 and 20 in.
Building
Fire
Brimstone
Brooms
Corn (for warehouses)
Steel
(Steel Loco.)
Whisk
Brushes, Artists
Calcimine 4 to 10 in.
Car Washer
Copying
Counter
Feather Duster (various sizes)
Gloss Paint (various sizes)
Glue
Marking
Mucilage
(Painters Dusters)
Sash, Nos. 1 to 8
Scrub
Stove
Varnish
Buckets, Coal
Paper for Coaches
Bung Borers
Bunting (Green, Red, White etc.)
Burners, Argand
Convex
Dietz
Double
Head Light
Lamp (Sun)
No Chimney
Novelty
Student Lamp
Bushings, Piston
Pump
Valve Stem
Buttons, Plush (Crimson, Green and Scarlet)
Butts, Loose Joint
Loose Pin 2 to 6 in.
Butts, Narrow Wrought ½ to 4 in.
Saloon, Acorn and N. P.
Table (various sizes)
Wrought Brass ½ to 4 in.
Cabs (for Locomotives)
Cages, Valves
Calendars
Candles, Coach
Canopies, Lamp
Cans, Oil (various sizes)
Tin Jacket 1 to 10 gal.
Train Water
Card Board, White
Cards
Carpets
Cars — Hand — Push and Dump
Casing Check
Casings, Cylinder Head Loco's
Castings

Brass Castings for Locomotives:
Bearings, Driving Box — Bearings, Engine Truck Axle — Bearings, Tender Truck Axle — Bearings, Main Rod Front — Bearings, Main Rod Back — Bearings, Side Rod — Bells — Blower Pipe Elbows — Branch Pipe Flanges — Branch Pipe Nuts — Check Valves — Check Valve Cage — Check Valve Seats — Check Nuts — Cocks, Cylinder in 6 parts — Cocks, Foot in 4 parts — Cocks, Blow off in 4 parts — Cocks, Heater in 6 parts — Cocks, Steam Gauge in 4 parts — Cocks, Pet in 4 parts — Cocks, Tank — Cocks, Three way — Cocks, Water Gauge in 4 parts — Cocks, Water Glass in 6 parts — Cross Head Liners — Cups, Guide Oil — Cups, Main Rod — Cups, Side Rod — Cups Tallow — Hose Nuts — Hose Nut Sleeves — Oil Cellars, Main Rod — Oil Cellars, Side Rod — Pump Barrels — Pump Gland Bushings — Pump Gland Bushing Rings — Pump Valve — Pump Valve Gauge — Pump Valve Seats — Packing Rings, Steam Cylinder Outside — Packing, Rings Steam Cylinder Inside — Safety Valves — Steam Chest Tallow Plug — Steam Pipe Ball Joint Rings — Tank Valves — Valve Stem Gland Bushings — Valve Stem Gland Bushing Rings — Whistles in 5 parts.

Iron Castings used for Locomotives:
Air Brake Fixtures — Arch Pipes — Bell Crank — Bell Frame Saddle — Bell Posts — Bell Yokes — Brake Dogs — Brake Hand Wheels — Brake Hanger Boxes — Brake Ratchet Wheels —

Cab Steps — Cab Brackets — Cab Handles — Center Truck Castings, Male — Center Truck Castings, Female — Checks — Check Bottoms—Check Chambers—Check Top Castings—Collars, Truck Axle—Crotch or T Pipes—Cylinders—Cylinder Heads, Front — Cylinder Heads, Back — Cylinder Head Casings — Cross Heads—Crown Bars—Deck Plates—Dome Casings in 3 parts — Dome Covers—Draft Castings, Tender, Back —Draft Castings, Tender, Front — Draft Castings, Pilot—Driving Boxes — Driving Box Cellars—Driving Box Shoes—Driving Box Wedges—Driving Spring Saddles—Driving Spring Hanger Saddles—Dry Pipes—Eccentrics — Eccentric Straps — Exhaust Nozzles—Exhaust Pipes—Fire Door Liners—Fire Door Frame—Fire Box Door — Flag Staff Sockets — Flue Plugs, Plain — Flue Plugs, Screw — Front Ends — Front End Doors — Front Number Plates—Goose Necks Grate Cross Bars, Front — Grate Cross Bars, Back — Grates, Drop — Grates, Rocker—Grates, Side—Grate Lifting Cams — Grate Lifting Shaft Boxes—Grate Lifting Shaft Crank—Head Light Brackets — Hand Hole Plates — Hand Rail Posts — Head Light Steps—Oil Houses—Oil House Covers — Plates, Check — Plates, Transom Top — Plates, Transom Bottom — Pockets, Spring — Piston Followers — Piston Heads — Piston Glands — Pump Chambers — Pump Chamber Bottoms—Pump Glands — Rocker Arms—Rocker Arm Boxes—Sand Boxes — Sand Box Covers — Sand Box Rings—Sand Box Saddles — Sand Box Valves — Sand Pipe Flanges — Shaker Shaft Brackets — Smoke Stack Cones — Smoke Stack Rings — Smoke Stack Saddles — Spring Saddles — Spring Shoes — Steam Chests—Steam Chest Covers — Steam Chest Casings — Steam Chest Glands — Steam Chest Valves — Steam Pipes — Tank Valve Seats — Throttle Pipes — Throttle Stem Stuffing Boxes — Throttle Stem Stuffing Box Glands — Throttle Valves — Throttle Valve Chambers — Throttle Valve Lifters — Truck Oil Boxes — Truck Oil Box Cellars — Truck Pedestals—Truck Centers, Male — Truck Centers, Female — Tender Frame Brackets — Wheels, Driving — Wheels, Truck — Wheels, Tender.

Iron Castings used for Cars:

Air Brake Fittings — Baggage Truck Wheels — Baggage Truck Follower Wheels — Beveled Washers — Body Bolster Truss Rod Bearings — Body Center Plates — Body Side Bearings — Body Truss Rod Bearings — Bolster Spring Caps — Brace Pockets, Right and Left — Brake Beam Chafing Plates — Brake Heads — Brake Hand Wheels — Brake Ratchet Wheels — Brake Ratchet Dogs — Brake Rod Guides — Brake Hanger Bearings — Brake Shoes — Brake Shaft Bearings — Brake Shaft Brackets — Buttons, End Door — Car Wheels — Corner Post Pockets — Coupling Spring Brackets — Crank Shaft Bearings — Cups, Side Bearing — Door Handles — Door Shoes, Top — Door Shoes, Bottom — Door Sills — Double Brace Pocket — Double Washers — Draw Bars — Draw Bar Chafing Plates — Draw Bar Side Casting — Draw Bar Spring Pocket — Draw Timber Guards — Draw Timber Pockets — Draw Bar Jaws — Equalizing Bar Spring Caps — Equalizing Bar Spring Seats — Gear Wheels — Grate Bars — Grate Shakers — Grates, Stove — Hand Car Wheels — Hand Car Pinions — Hand Car Cranks — Hand Car Rockers — Hand Car Journal Boxes — Journal Boxes — Journal Box Covers — Journal Box Cellars — King Bolt Plates — Pedestals — Pockets, Stake — Pockets, Post — Pockets, Spring — Pulleys, various kinds — Push Car Wheels — Rollers, Side Bearing — Roller, Side Bearing Castings — Rockers — Rocker Bearings — Sheaves, Pulley — Sliding Door Handles — Sliding Door Sheaves — Spiral Spring Seats — Spring Caps — Spring Cases — Spring Plank Bearings — Stove Castings — Transom Castings — Triangular Washers — Truck Bolster Chafing Plates — Truck Bolster Guide Bars — Truck Center Plates Truck Side Bearings — Truck Heads — Truck Bridges — Wash Stand Sinks.

Bridge Castings:

Brace Blocks — Clamp Plates — Keys, or Separators, 2 in. and 4 in.—

Valise Castings — Washers, various kinds — Post Plates.

Turn Table Castings :
Center Castings — Journal Boxes — Nuts — Post Plates — Washers, Plain and Beveled — Yoke Plates — Wheels — Geared Segments — Pinions, and Gear Wheels.

Miscellaneous Castings :
Coal Crane Castings, including Castings for top and bottom of mast, Step and Gears, and Journal Boxes — Hammers for Pile Drivers — Horse Power Gear Wheels — Horse Power Pinions — Horse Power Journal Boxes — Jack Screw Castings, various kinds — Lugs for Tank Hoops — Switch Chairs, one, two and three throw — Switch Step Chairs — Switch Stands — Switch Stand Gears — Switch Stand Journal Boxes

Castors, Bed
  Brass Socket
  Chair
Catches, Cupboard, (Brass and Bronze)
Cement, Building
  Iron
  Roofing
Chain, Brass
  Iron (various sizes)
  Switch
Chairs, Cane-seat
  Office
  Railroad
  Step, Track
  Switch
  Swivel
Chalk, Crayon
  Lines
  Prepared, (Blue, Green, etc.)
  White Lump
Chambers, Air
  Check
  Pump
Chamois Skins
Charcoal
Chimney Cleaners
Chimneys, Argand
  Argand Gas
  Dietz
  Dual
  Head Light
  Mail Car
  Old Style
  Sun
Checks, Baggage
  Conductor's
  Locomotive
Chisels, Cold Cape
  Flat
  Track
Clamps, Hose
  Spring Coupling
Clay, Fire
Clocks
Clothes Wringers
Coal, Blossburg
  Hard (various sizes)
  Hods
  Screenings
  Soft
Cocks, Air
  Bibb (Finished)
    (For Iron Pipe)
  Brass Liquor
  Drain
  Lazy
  Steam
  Stop (Brass)
    (For Iron Pipe)
Coils, Stove
Columns, Hand Rail
Copper, Ingot
  Round (various sizes)
  Sheet (various thicknesses)
Cord, Bell (Hemp)
  Sash and Seaming
Corks (various sizes)
Couplings, Belt
  Hose
  Miller Car
Covers, Wheel
Cross Heads (Iron and Steel)
Crucibles (various sizes)
Cups, Drinking
  for Copy Presses
  Tallow
Curtains and Fixtures
  Cab
Cushions, Caboose
  Chair
  Coach
  Engine, Double and Single
Cuspadores
Cylinders, Air Brake
  Pump
  Stove Pipe
Desks, Cylinder
  High
  Office
  Piano
Diamonds, Glaziers
Dies, Machine
Dippers, Tin
Dishes
Door Holders
Doors, Car
  Front End

Doors, House
Stove
Draw Bars, Cast and Wrought (various kinds)
Draw Bars, Pilot
Drills, Machine
Ratchet
Rock
Track
Duck (Enameled Green Sail, etc.)
Ears, Kettle (various sizes)
Elbows. Stove Pipe
Ells, Iron (various sizes)
Emery Cloth
(Coarse. fine, and medium)
Flour
Paper
Envelopes, of all sizes
Erasers, Rubber
Steel
Equalizers, Car Truck
Engine Truck
Escutcheon Pens
Plates
Escutcheons, Brass and Walnut
Eyelets
Sets
Fasteners for Cab Doors
Coach Doors
Faucets, Oil
Figures, Steel
Files, Flat Bastard, 3 to 18 in.
Second Cut, 3 to 18 in.
Smooth Second Cut, 3 to 18 inch
Half Round Bastard, 3 to 18 in.
Second Cut, 3 to 18 in.
Smooth Second Cut, 3 to 18 in.
Hand Bastard, 3 to 18 in.
Second Cut, 3 to 18 in.
Smooth Second Cut, 3 to 18 inch
Mill Bastard, 4 to 18 in.
Rasp
Round Bastard, 3 to 18 in.
Second Cut, 3 to 18 in.
Smooth Second Cut, 3 to 18 inch
Square Bastard, 3 to 18 in.
Taper, 3 to 12 in.
Filters, Well
Fish Plates
Flags, Red, White, and such other colors as are required by the code of signals.
Flag Staffs and Covers
Staff Stands
Flannel, Cotton
Flooring, Lip, Dry and Matched
Flour
Flues, Boiler (various sizes and lengths)
Flue Ends
Followers, Draw Bar
Piston
Forges, Blacksmith's
Boiler Maker's, Portable
Forks, Manure
Pitch
Frogs, Cast Iron
Steel
Frog Plates
Points, Steel
Frogs, Steel Rail (various lengths and spread)
Funnels
Furniture
Fuse
Gaskets, Rubber
Water Glass
Gauges, Air Brake
Steam
Drum
Track
Wire
Gibs, Cross Head
Gimp, Red, Scarlet, etc.
Glass, double thickness, all sizes.
Single thickness, all sizes
Plate
Ruby and Green
Glasses, Bull's eye, 4, 6, and 8 in.
Level
Water Gauge
Glazier's Points
Globes, Lamp, Center and Side
Lantern, Green, Red, White and other colors required by the code of signals
Glue, Common and White
Gongs, Locomotive and Station
Grass Lines, Leather
Hair, Curled
Hammers, Car Repairer's
Coal
Claw
Copper
Machinist's
Riveting
Stone
Handles, Adze
Auger
Axe
Chest, Cast
Wrought, Heavy and Light
Chisel
Cross-cut Saw
Drawer, Brass and Iron
File

Handles, Flag
Hammer, 12 to 36 in.
Hand Car
Saw
Hatchet
Lifting (Brass)
Long Spade
Maul
Mop
Pick
Saloon
Store Door (Iron, Brass and Bronze)
Hangers, Bag, Car Door
Spring, Locomotive and Car
Hasps
Hinged
Hatchets, Broad
Claw
Lath
Shingle
Head Lights
Lining (Prepared)
Heater
Hinges, 3 to 16 in.
Light Strap, 3 to 12 in.
Pin
Spring
Extra Heavy
Tee, Extra Heavy, 3 to 16 in.
Light
Hoes, Ash
Garden and Mortar
Hooks and Eyes, Brass
Bright Iron
Bush
Cabin Door
Cant
Packing
School House
Screw, Brass
"Bright Iron"
Wardrobe, Iron
Wrought Iron
Hoop Drivers
Hoppers, Saloon
Hose, Air Brake
Rubber
Steam
Ice
Tongs
Indexes
Injectors for Locomotives
Ink
Stands
Iron Angle
Band
Boiler
Charcoal
Iron Angle, Common Bar
Sheet
Flange
Flat Bar
Half Round
Hoop
Juniata Sheet
Low Moor
Nail Rod
Pig
Round
Sheet Charcoal
Galvanized
Sheet, Russian, American, and Imported
Square
Stay Bolt
Ulster
Jack Screw, Bridge
Car
Locomotive
Jacks, Hydraulic
Smoke
Track
Key Blanks, Steel, Brass and Iron
Car and Switch
Coach and Seat
Cross Head
Main and Side Rod
Split, Long and Short
Knives, Facing
Planing
Pruning
Putty
Knobs, Brass Car Door
Door, Brass, Mineral and Porcelain
Drawer (Bronzed and Porcelain)
Furniture
Nickel Plated Car Door
Silver Plated Car Door
Lacquer
Lagging, for Locomotive Boilers
Lamp Fillers
Fronts
Trimmers
Lamps, Bench
Boiler-maker's
Bracket
Candle
Center (for Coaches)
Cupola (Caboose)
Engineer's
Hanging
Mail Car
Mast Head
Side (Caboose)
(for Coaches)
Signal, for Bridges

Lamps, Stand, Glass
Station
Steam Gauge
Switch
Tail End
Water Gauge
Lanterns (of the various colors required by the code of signals)
Lantern Tops, Brass
Latches, Mortice and Thumb
Night
Yale
Rimmed (Knob)
Saloon (Brass)
Lead, Bar
Pig
Sheet
Leather, Calf-skin
Harness
Lace
Sole
Lenses, Green and Red
Letters, Steel
Levels, Spirit
Track
Lime
Links, Coupling (Crooked and Straight
Locomotive
Locks, Car Seat
Chest, Brass and Iron
Dead, Rimmed, Tubular
Drawer, Brass
Iron
Yale
Freight Car
Mortice, Door
Mortice, Tubular Knobs
Pad, various kinds
Passenger Car
Rim, Door
Saloon
Seat, Bronzed and Nickel-plated
Switch
Wardrobe, Brass and Iron
Yale
Lumber, Ash, Black Walnut. Cherry, Elm, Maple, Oak, Pine and White Wood, or other kinds indigenous to the country
Lye, Concentrated
Machinery
Manganese, Black
Maps
Matches
Match Safes
Mats, Door
Matting, for Coaches
Mattocks, Long
Marline
Mauls, Ship
Spike
Track
Measures, Tin
Mica
Mirrors
Montana Cloth
Mops, Cotton
Mouldings, Gilt
Various Patterns
Mucilage
Nails, Casing
Clinch
Clout, Black, ⅛ to 2 in.
Tinned, ⅛ to 2 in.
Common, 2 to 60d
Finishing
Lining
Plush, Crimson, Green and Scarlet
Silver Lining
Saddle
Seating
Naphtha
Needles, Bag, Sail and Upholsterer's
Nippers, Wire
Nipples, Various sizes
Nozzles, Hose
Nut Locks, Track, various patterns
Nuts, Forged
Hexagon, ¼ to 2 in.
Hose Sleeve
Spanner
Square, ¼ to 2 in.
Oilcloth
Oil, Cylinder
Kerosene
Lard
Lubricating
Mineral Sperm
Neats Foot
Pure Sperm
Signal
Oilers, Engineer's
Hand Car
Spring Bottom
Packing, Eagle
Hemp
Rubber Sheet
Soap Stone
Pails, Fire, Paper
Iron, Oil and Waste
Tin, Tallow
Wooden, 2 and 3 Hooped
Paints
Asphaltum — Benzine — Black, Drop — Black, Iron — Black, Lamp — Blue, Prussian — Blue, Ultramarine — Bronze, various numbers — Brown, Van Dyke — Carmine —

Coach Color — Flock — Gold Leaf — Green, Chrome — Green, Hamden — Japan — Lake, Crimson and other shades — Lead, Red Dry — Lead, White Dry, and in Oil — Litharge — Mineral — Ochre, Oxford — Oil, Linseed, Raw and Boiled — Paint Dryer — Paint, Fire Proof — Paint, 4 Ace — Red, Indian — Red, Tuscan — Red, Venetian — Shellac, Brown, Orange and White — Sienna, Burnt and Raw — Smaltz, various colors — Umber, Burnt and Raw — Varnish, Body — Varnish, English — Varnish, Rubbing — Vermillion, American — Vermillion, Chinese — Vermillion, English — Vermillion, Trieste — Yellow, Chrome, various shades — Yellow, French — Zinc, White

Pans, Ash, Locomotives
- Stove
- Dripper Oil
- Dust
- Tin

Paper Clips
- Cutters
- Fasteners (various sizes)
- Files
- Legal Cap
- Letter
- Manifold
- Note
- Oiled
- Roofing
- Sand, Nos. 0 to 2½
- Sheeting
- Statement
- Tissue Impression
- Water-closet
- Weights
- Wrapping

Pencils, Lead
- Lettering
- Slate

Penholders
Pen Racks
Pens, Writing and Ruling
Petticoat, Locomotive
Picks, Railroad
Pike Poles
Piles, Hemlock, Oak and Pine, or other woods indigenous to the country
Pilots (for Locomotives)
Pins
- Center
- Coupling, Flat and Round
- Crank

Pipe, Brass (various sizes)
- Copper (various sizes)

Pipe, Dry Steam
- Fitter's Tools: Cutters, Dies Screw Plates, Taps, Tongs and Vises
- Fittings, including the following items: Bushings, Caps, Couplings, Elbows, Flanges, Lock Nuts, Nipples, Plugs, Reducers, Tees, and Unions — various sizes of each
- Gas
- Lead, (various sizes)
- Plunger
- Stay Bolt
- Stove, Common and Russia Iron
- Wrought Iron (⅛ to 6 in.)

Pipes, Branch
Pistons, Main
- Reversing

Piston Spiders
Pitch
Plank, Ash, Oak, Pine and White Wood, or other indigenous woods
Plastering Hair
Plaster Paris
Plows, Ditching
- Gravel (for unloading cars)
- Snow

Plumbago
Plush, Cherry, Green and Scarlet
Plyers (various sizes)
Pokers, Stove
Postage Stamps
Posts, Cedar (Stock Yards)
- Fence
- Mile
- Section
- Telegraph
- Whistling

Potash, Prussiate
Pots, Marking
- Paint
- Sprinkling
- Tin, Oil and Tallo

Pounce
Powder, Blasting
Presses, Copying Letter
- Statement

Pulley Blocks (various sizes)
Pulleys, Differential, for raising heavy weights
- Frame
- Screw
- Side
- various sizes, for shafting

Pump Heads, Top and Lower
- Plungers

Pumps, Engine
- for Cisterns and Wells

Pumps, for Water Stations
Oil
Rotary
Union
Punches, Ticket
Track and Belt
Putty, Common
Lead
Quadrants
Rack Ends Basket, "Brass"
Rails, Iron
Steel
Rakes, Garden
Hay
Reamers
Reflectors, Head Light
Lamp
Reservoirs, Air
Resin
Rests, Arm, for Clerks
Engines
Riddles, Ash
Rings, Flush Brass
Lamp
Stove
Ventilator
Rivets and Burrs, Belt "copper"
Black and Tinned Iron, various sizes
Button Heads
Flat Heads
Iron (various sizes and lengths)
Round Head
Rods, Main and Side, Locomotives
Rope, Manilla, ¼ to 4 in.
Ropes, Switch
(wire)
Rubber Bands
Cement
Pure, 1 in thick
Rulers, Office
Rules
Safes, Office
Sal Ammoniac
Sal Soda
Salt, in Barrels
Sand, for Locomotives
Sash Catches, Deck, N.P.
Fasteners
Lifts, Bronze and N.P.
Locks, N.P.
Pivots, N.P.
Springs, Deck, Brass
Stops, Brass
Saw Blades
Saws, Band
Buck
Circular, Rip and Cross-cut
Cross-cut
Hack
Saws, Hand
Scroll
Scales, Counter
Depot
Hay
Platform
Spring Balance
Stock
Track
Warehouse Dormant
Scrapers, Road
Screw Drivers (various sizes)
Eyes, Bright and Iron, various sizes
Screws, Bench, Iron
Brass (various sizes and lengths)
Iron (various sizes and lengths)
Lag (various sizes and lengths)
Nickel-plated (various sizes and lengths)
Set
Silver Capped (various sizes and lengths)
Wood
Scythes, Bush
Grass
Weed
Scythe Snaths, Bush and Grass
Sealing Wax
Seal Presses
Seals for Car Doors, Lead and Wire
Seaming Lace, Crimson
Scarlet
Seat Arm Plates, Brass and N.P.
Arms, Bronzed and N.P.
Stops
Sieves, Flour and Mortar
Sand
Settees
Shade Holders, for Lamps
Shades, Lamp and Window
Shafting
Shears, Bent Trimmers
Lamp
Straight Trimmers
Tinner's Bench
Snip
(various sizes)
Sheaves, Tank
Sheet Brass (various thicknesses)
Sheeting, Cotton
Shims, Track
Shingles, Cedar, Pine, etc.
Shipping Tags
Shovels, Common
Long Handled
Scoop
Snow
Stove, Long and Short Handled
Track

Siding for Buildings
Cars
Signals and Signal Fixtures of the various patterns in use, whatever they may be
Signs, Crossing
Station
Slate Roofing
Slates
Sledges
Smoke Stacks, Locomotives
Soap, Castile, White and Mottled
Common
Toilet
Solder, Soft and Spelter
Spades, Long and Short Handled
Spelter
Spike, Boat
Cut
Track
Sponge Cups
Sponges, Common and Lamb's Wool (various grades)
Spring Bolts, for Windows
Lifts
Springs, Blind
Car (various styles and sizes)
Coach Seat
Door, various patterns
Locomotive, various kinds
Sash and Windows
Tender
Valve
Sprinkling Cans
Squares, Steel
Stamps, Date (metal)
Rubber
Staples, Common
Steel (for wire fence)
Starch, Corn
Silver Gloss
Stationery, Office
Steel Castings, for Locomotives (various patterns)
Steel, Cast, Octagon, Round and Square, various sizes
Steel, Chrome, various sizes
Forgings, various patterns
Plates, various sizes and thicknesses
Sheet, various sizes and thicknesses
Smoke Stack, No. 10 and 12
Spring (various sizes)
Stone, Pumice
Rotten
Stones, Grind
Oil
Scythe
Stools, High Desk
Stove Boards, Zinc
Polish
Shakers
Stoves, Caboose
Coach
for Shops (wood and coal)
Sand (for drying)
Station (wood and coal)
Water Stations (wood and coal)
Straight Edges
Strainers, Air (for Air Brakes)
Hose (for Locomotives
Studs, Cylinder Head
Steam Chest
Sulphur, Flour
Swages
Swedge Blocks
Switches, Blind or Ground
High Target
Semaphore
Target (double and single)
Tables, Office
Tacks, Cut, 2 to 24 oz.
Gimp
Tinned Carpet
Upholsterer's, 2 to 24 oz.
Tallow
Compound
Tryers
Taps, Machine
Tapes, Measuring (various grades and lengths)
Tarpaulins
Telegraph Instruments
Terry, Brown, Gold and Green
Thimbles, Flue
Thread (Cotton and Linen, colored and white)
Throttle Levers
Ratchets
Ticket Cases, Passage
Stamps
Tickets, Delivery
Fuel
Passenger
Ties, Bridge
Railroad
Switch
Track
Timber, Bridge, 10 to 50 ft. long
Tin, Block and Pig
Coke, various grades and sizes
Japaned
Perforated
Plate, Bright, various grades and sizes
Roofing, various grades and sizes
Tires, Steel Car, various sizes
Locomotive, various sizes
Tongs, Blacksmith's

Tongs, Stove
Torches
Torpedoes
Towels, Roller and Short
Track Levers
Transoms
Traps, Mouse and Rat
Tripoli
Trowels, Mortar
Truck Bars, Diamond and Straight
Jaws
Saddles
Trucks, Baggage, 4 Wheels
2 Wheels
Engine, Tender, and Car
Warehouse, Light and Heavy
Truss Rods, various kinds
Turpentine
Twine, Cotton, Flax and Hemp
Mattress, Sail and Spring
Urinals, Saloon
Valves, Angle, Brass, ¼ to 2½ in.
Check, Iron, 2½ to 5 in.
Foot
Globe, Brass, ¼ to 2½ in
Iron, 2½ to 6 in.
Ludlow
Receiving and Discharge
Stems
Veneers, American and French, Bird's Eye, Common, Holly, Maple, Walnut and White
Ventilator Sticks
Vises, Bench, various patterns and sizes
Vitriol, Blue and Liquid
Wash Basins, Tin
Bowls, Porcelain
Washers, Steel, various sizes
Wrought Iron, various sizes
Washing Powder
Waste Baskets
Waste Baskets, Colored and White
Cop
Water Coolers, 6 to 10 gal.
Earthen
Kegs
Tanks
Webbing
Wedges, Driving Box
Wheelbarrows, Canal, Ditch and Stone
Whiting
Wicking (candle)
Wicks, Argand, (for Coach and Student Lamps)
Kerosene Oil, Nos. 0, 1 and 2
Lard Oil
Mail Car
Wire, Brass (soft, various sizes)
Spring
Cloth, Brass, various widths and meshes
Green, for Screens
Copper, various sizes
Fence Barb, Nos. 8 and 9
Iron, Nos. 8 and 9
Stretchers
Iron, Annealed, various sizes
Tinned, various sizes
Netting, Steel, for Locomotives
Rope
Steel, various sizes
Telegraph
Wood, Sawed
Unsawed
Wrecking Frogs, Steel
Wrenches, Cylinder Heads
Pipe
Screw, 8, 12 and 15 in.
Track
Yokes, Guide
Valve
Zinc, Sheet

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